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EMPLOYERS in any part of the world who require the services of superintendents, mining or civil engineers, metallurgists, chemists, mine or furnace foremen, or other assistance of this character, can have their wants advertised in the ENGINEERING AND MINING JOURNAL without charge.

THE END-LINES OF LODE CLAIMS.

We publish in another column a letter on this subject, which constitutes a contribution of real value to the discussion. That the question is one of both importance and difficulty, no one can deny. It is involved, in one of its phases, in the case of the Elgin Mining Company against the Iron Silver Mining Company, now before the United States Supreme Court on appeal; and its decision by that tribunal is awaited with anxiety by all who realize its bearing upon mining titles. We earnestly hope that the form of that case will be such as to secure a real settlement of the main question, and that such a settlement will be made with care and deliberation commensurate with the importance of the issue, and in terms which will not complicate still further a situation already well-nigh chaotic.

Our correspondent argues that the end-lines of a claim should be in all cases drawn in the direction of the true dip. He urges that such a construction of the statute is in accordance with the intention of its framers as shown by the fact that bills, almost identical with the present law, which passed, one in the House and another in the Senate, contained a provision requiring end-lines to be thus drawn, and that the omission of that provision in the act finally passed by both houses was regarded as immaterial. Furthermore, he argues, from the language of the statute, that such remained the intention of Congress; that the general usage of miners to the contrary, if it exists, was at least unknown to the Public Land Commissioner of 1880; and finally, that his view seems to be favored by the Flagstaff case, and is sanctioned by the decision of Judge CHURCH, of Dakota, in the Sitting Bull case.

On these statements we offer the following comments:

1. There are two distinct questions involved. One is, shall the surveyed end-lines of a location, duly made and even patented, be the lines through which vertical planes shall be drawn to bound the extra-lateral rights of the locator or patentee on all lodes having their apexes within his claim, or must other lines be drawn, corresponding with the dip of the vein on which the location is made? The other is, When the apex of a lode does not cross the surveyed end-line at all, but departs from the claim across a side-line, so that, under the Flagstaff decision, the side-line becomes an end-line, shall the vertical bounding plane be drawn through the existing side-line, or parallel with the other end-line (in case the latter *is* crossed by the apex) or at right angles to the local true course, or the general true course, or the local or general surface course, of the lode? Both these questions are multiplex; but the distinction between them is manifest. In the one case, a line already exists, which the letter of the statute recognizes; in the other, a new line has to be drawn, which the construction of the statute requires.

2. As to the intention of Congress, the ingenious and interesting argument of our correspondent is scarcely conclusive. He proves merely that Mr. SARGENT represented as immaterial a change in the proposed law which was in reality material. But he does not show that the Senate, which had made this change, made it without cause or definite intention; and the fact that the Senate had on a previous occasion passed a bill containing the provision which on this occasion it struck out, goes rather to show intention than the opposite. The striking out was a positive act, not to be construed like a passive omission.

3. The argument based on the language of the statute, giving to locators "the *exclusive* right . . . throughout their entire depth," etc., labors under several difficulties.

In the first place, this exclusive grant is limited by the next sentence, which confines it to such exterior portions of the veins mentioned "as lie between vertical planes, *drawn downward as above described*, through the end-lines of their locations, so continued *in their own direction* that such planes will intersect such exterior parts," etc. We have italicized two phrases here. What is the manner "above described" of drawing the vertical planes? The reference is to the preceding sentence, which contains the general grant of the surface, and of all lodes the apex of which lies inside of the "surface lines extended downward vertically.' In other words, the vertical end-planes are to be drawn, like the vertical side-planes, *through the surface lines* of the location. And further, they are to be continued "in their own direction," which means, if it means any thing, that they are not to be changed on account of the dip of the vein, or any other subterranean or subsequent phenomena, after they have once been fixed by the survey, and, *a fortiori*, by the patent.

In the second place, the extra-lateral right is granted on *all* lodes having their apexes within or vertically under the surface of the claim. Now, it is not to be presumed that all the lodes so covered will have the same course and dip. Yet the extra-lateral right is evidently bounded, *as to all* of them, by a single pair of planes, drawn vertically through the end-lines of the location. It would be absurd to enact that these planes shall be at right angles to the true course of all the lodes they thus intersect; and we surmise that this is the reason the Senate struck from the proposed law the provision which seemed to have been rendered impracticable by the extension of the mining grant from one lode to an indefinite number. The purpose of that extension is well known. It was to

prevent intricate disputes about the identity of lodes within a location. We concede that the remedy was bunglingly applied. The statute, and still more the ridiculous patents issued to this day under it by the General Land-Office, can easily be shown to retain relics of the earlier system, not strictly consistent with the later. But this concession does not remove the difficulty we have suggested. After all, the present law is plain enough as to end-lines, in its literal sense. The point made by our correspondent, that this literal sense can not be the correct one, because it works hardship, in that all locators can not fare alike under it, is equally applicable to other provisions, and proves simply that the statute should be amended.

Again, the United States Supreme Court has distinctly said, in the Flagstaff case, that claims will naturally be laid on the line of the surface outcrop (or surface exploration), "whatever be the character of the surface, whether level or inclined," and that "the end-lines of the claim, properly so called," are "those which are crosswise of the general course of the vein *on the surface*." It admits that the law may be imperfect in this respect, and that perhaps "the true course of a vein" should correspond with "the line of a level run through it;" but it adds that "this can rarely be ascertained until considerable work has been done, and after claims and locations *have become fixed*." The words we italicize here are significant of the respect accorded by the court to lines once fixed.

But even if the law directed end-lines to be drawn at right angles to the true general course of the vein, would this direction invalidate end-lines once fixed, but not exactly in accordance with that direction? We mean, assuming that the lode in question crossed the end-lines, and that they possessed also priority of location. On this point, the famous Eureka case gives a significant indication. In that case, two patents were objected to, because their end-lines were not parallel. The court ruled, first, that there was not proof as to the locations, which might have been under the act of 1866, not requiring parallel end-lines, and that the presumption of validity was with the United States patent, which in its potency "is iron-clad against all mere speculative inferences;" second, that the provision of the statute requiring parallelism "is merely directory, and no consequence is attached to a deviation from its direction;" third, that "the defect alleged does not concern the defendant, and no one but the government has the right to complain." The last statement is especially important. It disposes of the argument of our correspondent, that the law does not specifically grant advantages to prior locators, in its grant to "all locators." The rights of priority are self-enacted, and as old as the rights of property. The government can not give away the same thing twice; and the terms of its grant to the first-comer can not be construed away by any complaint of the second comer.

4. Whether the Public Lands Commission knew of the existence of the universal usage of miners under the statute is not a material point. The commission took evidence in 1879, when the statute had been in operation about seven years. Another seven years have elapsed; and the usage has become doubly intrenched. But if our correspondent cares to pursue the inquiry as to the Public Lands Commission, we refer him to page 402 of its Report, where he will find in the letter of Judge BEATTY, one of the ablest contributors to that volume, a clear statement of the principle that where the apex crosses an end-line, that line, though not at right angles to the true course, determines the boundary of the extra-lateral right, under what the author considers "the only admissible construction of the law." Judge BEATTY argues for a line at right angles to the true course, as a boundary, when, by reason of the departure of the lode from the claim, a new end-line is required. He urges that *this* would not contravene the statute; but he does not venture to say that an existing end-line, made valid by the crossing of the lode at whatever angle, can be, under the statute, and against the terms of a patent, so re-drawn. In the case he gives, the law would work hardship to two patentees, and he says, "The only remedy would be to cancel the patents of A and B, and allow them to readjust their surface-lines." But to the pertinent inquiry of DOGBERRY'S watchman, "How if they will not?" Judge BEATTY offers no reply. In case the patentee is *benefited* by the position of his end-lines, the "remedy" fails. But what is there to be remedied, if, as the Eureka decision says, no one but the government has a right to complain? At all events, the learned judge comes to a discreet conclusion, with the words, "Having no plan to suggest, . . . I take my leave of the subject."

5. Concerning the Flagstaff case and the Sitting Bull case, our opinions have been elsewhere expressed. Our correspondent does not seem to have read with care the appendix to *The Law of the Apex*, though he cites it in his letter. The decision of Judge CHURCH is there reviewed, and in the observations there made we have no modification to make.

6. Our purpose in this article has been to defend the statement formerly made by us, as to the difficulties in the way of our correspondent's construction of the law, not to prove that such a construction is impossible and ought not to be made. On this whole subject, our opinion has been fully given in the paper referred to; and we will not here restate it at length. In summary, it is this. The construction of the law advocated by our correspondent is desirable on many grounds, if it be practicable; whether the letter of the law will permit it, is doubtful; but the Supreme Court can take liberties with the letter which lower tribunals and individual commentators can not take; and if the Supreme Court should adopt this view, we should not be sorry, even though it might thereby disturb lines heretofore supposed to be settled. But the difficulties of the case are so great that the law itself ought to be changed to meet them. Unfortunately, such a change would not cure the evils of existing titles; but there would be a great gain in stopping the source of future trouble.

7. In considering what change should be made in the law, we are forced more and more to the "square location" as the only adequate reform. We deemed this reform impracticable a score of years ago, though we recognized, even then, its advantages. It was found impracticable in 1880, when the recommendations of the Land Commission fell dead. We are not sanguine of its acceptance by the mining communities now; but we think public opinion in the West has gradually changed in its favor to a considerable degree, and we wish it might be tried.

MINERAL PRODUCTION OF NOVA SCOTIA.

The report of Mr. EDWIN GILPIN, Jr., Inspector of Mines, for the year 1885, gives, as usual, a vast amount of useful information. No doubt, it will now interest a far greater number than heretofore, since the visit of so many engineers to Nova Scotia, at the Halifax Meeting of the American Institute of Mining Engineers.

The following summary gives the quantities of the various minerals raised in 1885 and 1884:

		1884.	1885.
Gold	Ounces	16,079	22,203
Iron ore	Tons	54,885	48,129
Manganese ore	"	302	353½
Copper "	"	110	....
Lead "	"	100	....
Barytes "	"	....	300
Antimony " (amount exported, 1885)	"	600	758
Coal raised	"	1,389,295	1,352,205
Gypsum	"	111,068	87,644
Building-stone	"	780	3,827
Coke made	"	40,085	30,185
Limestone	"	25,567	16,429
Grindstones, etc	"	2,200	2,208

The coal output has not increased, probably owing in part to the very low price of American bituminous coal in 1885, in part to the high duty (75 cents a ton) imposed on coal coming into the United States, and in part to the fact that, notwithstanding the great thickness of the coal-beds in Nova Scotia and their regularity in many of the fields, yet, owing to high wages and other elements of cost, the cost of mining in Nova Scotia is very nearly if not fully double that of mining in our own Cumberland and Clearfield districts.

We have already had occasion to speak of the magnificent coal-beds worked by the Cumberland Railroad and Coal Company, at Spring Hill, N. S., and of the facilities that this company possesses, or will soon possess, for supplying our Eastern seaboard market. If this company could mine coal at the same cost as our own Cumberland companies, it would become a very strong competitor in the East, especially should the import duty be abolished, as is now proposed.

This company produced 335,055 tons of coal, of which 93 per cent was sold, 5 per cent was used at the colliery and by employés, and the remainder was probably slack. Of the coal sold, 58,178 tons were "round," 75,375 tons slack, and 178,244 tons run of mine. There were 142,875 days' labor under ground, 40,361 days' labor on the surface, or a total of 188,064 days, by 719 persons, giving an average of 4 tons of coal per day per cutter, and a total output from three inclines averaging 1288 tons a day, the pits having worked 260 days.

This colliery had the largest output of any in Nova Scotia. Under the Miners' Union rules, which are in full force in Nova Scotia, the cost of cutting coal varies from 40 to 50 cents a ton, and the other expenses probably amount to as much more, making a total cost at the colliery of probably from 90 cents to $1 a ton, or nearly double what it costs at some of our Maryland mines.

Nova Scotia exported to this country only 34,483 tons in 1885, the smallest quantity in the last thirty-five years.

The output of gold was about $100,000 greater than in 1884. The increase appears to have been due to exceptionally rich ore found in the New Albion mine, Montagu District, which in the month of September (at the date of the visit of the Institute of Mining Engineers) produced 1384¼ ounces of gold from 376 tons of rock. The Oldham District produced 2360 ounces of gold from 1170 tons of quartz. The average of the entire output of Nova Scotia in 1885 was 15 dwt. 4 gr. per ton, or say $15 a ton; 28,890 tons of ore were crushed. The average earnings per man per day are stated to have been $2.53.

Nova Scotia unquestionably possesses many natural advantages that should secure for it a great future as a mining country; but there seems to be a great lack of the restless energy that has developed our Western mines and built up in many single districts in a few years industries exceeding in output that of all the Nova Scotia mines.

CORRESPONDENCE.

[We invite correspondence upon matters of interest to the industries of mining and metallurgy. Communications should invariably be accompanied with the name and address of the writer. Initials only will be published when so requested.
All letters should be addressed to the MANAGING EDITOR.
We do not hold ourselves responsible for the opinions expressed by correspondents.]

Amalgamated Copper Plates.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: Will any of your readers enlighten me by answering through the ENGINEERING AND MINING JOURNAL the following question: Why do amalgamated copper plates color so badly in a gold stamp mill, especially where there is a paucity of gold in the ore? D. L. W.

The Pyrrhotite of the Ely Mine.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: Certain numbers of the JOURNAL last summer contained a discussion between Dr. Peters and Mr. Cazin as to whether pyrrhotite or pyrite was the nature of the "mundic" gangue of the Ely mine, Vermont. It was stated by Dr. Peters, in his very valuable series of articles on copper smelting, that the "mundic" of this mine was pyrrhotite, in which he certainly was correct if the characteristic difference in appearance between pyrite and pyrrhotite is to be relied on. This statement was denied by Mr. Cazin in a special letter to the JOURNAL, the reasons for which he gave later, that (*a*) it was not magnetic, and (*b*) that it had the composition of pyrite and not that of pyrrhotite. If the latter were correct, this would be a very interesting new variety, as the peculiar and very characteristic bronzy-brown color, the hardness, streak, and uncrystallized granular condition, all certainly indicate pyrrhotite, while that is the name under which it has been classified in current publications. Absence from town at that time prevented me from examining a complete suite of specimens that I personally collected from the Ely mine, and I now take advantage of such an opportunity.

With regard to the magnetism of the Ely "mundic," I find that different specimens from this mine show similar differences in magnetic properties as those from other localities. Some specimens of the Ely "mundic" are quite magnetic to even a feeble magnet; that is, small fragments of it are picked up or are attracted by the magnet, though none of it seems to possess individual polarity, or to affect a delicate compass-needle. Most of it, however, and especially that which is finely disseminated through the quartz or chalcopyrite, is very feebly magnetic, requiring a very strong magnet to attract it, even when crushed to a fine powder. Such variable magnetic properties are not unusual, as we find similar uncertainty and variation even in the mineral magnetite—from "lodestone," which possesses strong polarity, to specimens that have weaker magnetic properties than some of the Ely "mundic." Though the average "mundic" of the Ely mine is certainly too feebly magnetic to admit of utilizing this property for economic separation, as desired by Mr. Cazin, it is no reason why it should affect its mineralogical classification.

With regard to the composition, it must be said that Mr. Cazin's basis on which he holds the composition to be that of pyrite or Fe 46·7 per cent, S 53·3 per cent, is exceedingly questionable and highly vulnerable. He deduces it from a determination of the copper, sulphur, and silica in a presumed average sample of the mine, and these three known quantities adding up to 67·8 per cent of the total, the balance, or 32·2 per cent of undetermined material, is assumed to be probably iron. Now, the ore of the Ely mine is copper pyrites, and its gangue is essentially "mundic," though small amounts of zinc-blende also occur with it, while intimately associated with these sulphides is free quartz and mica-schist—the schist being the country-rock and the vein itself apparently one of segregation. If the analysis that Mr. Cazin quotes from is that of an average sample, it will certainly contain an unknown but decidedly appreciable amount of these other substances, which will prevent a definite solution of an equation with so many quantities when only three are known. Typical samples of the moderately magnetic and the very feebly magnetic "mundic" were carefully picked out free from the other associated minerals, and on subjecting them to careful analysis, gave the following results:

	Magnetic. Per cent.	Feebly Magnetic. Per cent.
Sulphur	39·50	39·18
Iron	60·38	60·21
Copper	.....	0·00
Insoluble	0·00	0·30
Total	99·88	99·69

From these analyses, which show that the *magnetic properties* are simply the not unusual individual variations of the same mineral, it is evident that the chemical composition confirms the highly characteristic appearance of the Ely "mundic," that it is a typical pyrrhotite, which Dana gives as consisting of Fe_7S_8, or sulphur, 39·50 per cent; iron, 60·50 per cent.

The small amount of insoluble siliceous matter in the analysis of the "feebly magnetic" sample is due, probably, to talcose matter, thin scales of which freely penetrated between the cleavage planes of the pyrrhotite, and some of it escaped complete removal in preparing the sample.

Respectfully, H. A. WHEELER.

WASHINGTON UNIVERSITY, ST. LOUIS, March 17.

The End-Lines of Lode Claims.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: My attention has recently been particularly called to Dr. Raymond's discussion with regard to the direction of the end-lines and the "course downward" of a mining claim located under the United States Statute of 1872. (See *The Law of the Apex*, Transactions of Amer. Inst. of Mining Engineers, Vol. XII., page 387, *et seq.*, and page 677, *et seq.*). He suggests, as a possible interpretation of the statute, that the end-lines of a claim should be projected vertically downward *on the true dip* of the vein (pages 437 and 439, *Law of Apex*), instead of being extended in their own direction on the surface, and boundary planes drawn vertically downward through them as so extended.

One of the objections Dr. Raymond makes to the interpretation suggested is, that it seems to be contrary to the express letter of the statute. That such a construction of the act is in accordance with the intention of the framers of the statute, however, is, I think, quite curiously shown in the official records of the passage of the act itself.

On February 6th, 1871, Mr. Stewart introduced into the Senate Senate Bill No. 1103, which provided at the end of the second section that "the end-lines of each claim shall be parallel to each other, and *at right angles with the general course of the vein.*" Section 3 of this bill was precisely similar to Section 2322 of the Revised Statutes, with three or four purely verbal exceptions. This bill passed the Senate. (*Congressional Globe*, 41st Congress, Part 2, page 9850, and Part 3, page 1805). But, according to Mr. A. A. Sargent, it failed to pass the House for want of time, though the House Committee on Mines and Mining, of which Mr. Sargent was a member, was ready to report favorably upon it. (See *Congressional Globe*, 42d Congress, Part 1, page 534.)

In the next Congress, Mr. Sargent introduced into the House House Bill No. 1016, "To Promote the Development of the Mining Resources of the United States," which contained the same provision with regard to the end-lines being at right angles with the general course of the vein, and which, with a single exception as to the time of advertising notice of application for patent, was the same as the bill passed by the Senate of the 41st Congress. This bill passed the House without amendment. (*Congressional Globe*, 42d Congress, Part 1, page 535.) But in the Senate it was amended, and in the amendment the words "and at right angles with the general course of the vein" were omitted. (Part 3, page 2456.) When the bill as amended came up in the House for concurrence, Mr. Sargent said, "The variations from the bill as passed by the House are very trifling; the amendments are really merely verbal except as to one or two points upon which I can make an explanation." He then explains the amendment from "any person" to "any citizen of the United States," etc.; the amendment as to the length of the claim; an amendment as to the conformation of placer claims to legal subdivisions of the United States Survey; and an amendment, "and I believe the last one of any materiality," as to agricultural land within mineral land. The bill, as amended, was then concurred in, and became a law. (Part 4, page 2899.)

We thus see that a bill almost identical with the one that is now the law, but which contained a provision that the end-lines of the claim should be at right angles with the general course of the vein, passed both the House and the Senate, and that the omission of that particular provision in the act as it was finally passed was regarded by the House as a "merely verbal" alteration, and as immaterial.

As the bill was originally drawn, the following provision that "the right of possession to such outside parts of such veins or ledges shall be confined to such portions as lie between vertical planes drawn downward through the end-lines of their locations so continued in their own direction that such planes will intersect such exterior parts of such veins or ledges," was consequently framed on the supposition that the end-lines should be at right angles to the general course of the vein, and that the "course downward" was equivalent to the true dip. When the "immaterial" clause as to the right angles was omitted from the bill, Congress quite naturally overlooked the necessity of changing the language just quoted, so as to provide that, in case the end-lines should not be drawn at right angles with the course of the vein, the miner would still be compelled to follow the course downward on the true dip, and to project his end-lines downward accordingly.

That it still remained the intention of Congress that the true dip of the vein should be followed, and that the end-lines should be vertically projected downward on the true dip, even though they were not drawn at right angles to the general course of the vein, would seem to appear from the language of the act itself. "The locators of all mining locations . . shall have the *exclusive* right of possession and enjoyment of all veins, lodes, and ledges *throughout their entire depth*, the top or apex of which lies inside" of their surface lines. A locator on one part of the unappropriated apex of a vein is here given exactly the same rights as any other locator upon another part of the unappropriated apex of the same vein, without regard to the priority of their respective locations. Each locator has the *exclusive* right of possession and enjoyment to a definite portion of the vein, *throughout its entire depth*. The only way in which this exclusive right can be guaranteed them is by compelling all locators to project their end-lines vertically downward *on the true dip*, and this is also the only way in which a locator can be limited to a given length along the vein.

It is true that, under this construction of the statute, the actual length of vein obtained under a full location on a hill-side would decrease as the steepness of the hill increases. The hill-side locator would get no more of the vein by drawing his end-lines obliquely to the course of the vein than by drawing them at right angles to it. He should provide for this contingency by making several end-to-end locations upon the outcrop.

But what if he does fail to get 1500 feet of the vein itself? The statute nowhere guarantees a locator 1500 feet *of the vein*. It only allows him 1500 feet "*along* the vein or lode," not *of* the vein or lode. That is, it simply allows him 1500 feet measured along the outcrop, and as much of the vein itself as the surface measurement happens to cover.

Even if the statute did grant him 1500 feet of the vein itself, it does not grant this amount to one locator any more than to another, or give the prior locator any preference over the subsequent one, and the prior locator has no more right under the statute to complain if he is so unfortunate as to get less than 1500 feet than has the subsequent locator under like circumstances.

It has been objected that this construction would contravene the general usage of miners. That such a usage, if it exists, was unknown to the Public Land Commissioners appears from page xl. of their Report, in which they raise this precise objection to the present law. They say, "In a very large class of cases of ore-deposits, the valuable bonanza, or pay-chimney, does not descend on the line of the dip, where it may be legally followed beyond the side-lines, but rakes off at a sharp

angle, and the ore-chimney passes out through the plane of the end-lines, where the owner can not follow it."

This quotation also shows that the Land Commissioners adopted the construction of the law now contended for. The Flagstaff case, too, seems to favor it, while Judge William E. Church, of Dakota, has given it his sanction in the closely contested case of Duggan *et al. vs.* Davey *et al.* (Black Hills *Pioneer*, August 9th, 1884.)

On the whole, this interpretation seems to me to be by far the least objectionable and, in fact, the only possible solution of the difficulties of the case.

Norman T. Mason.

University of Michigan.

OFFICIAL STATEMENTS AND REPORTS.

Huron Copper Mining Company, Mich.

The following are the expenditures at the mines and in Boston during the year 1885, as stated in the company's report:

Mining expenditures, labor, etc	$43,251 38
Sinking 278 feet shafts and 210 feet winzes	7,939.55
Drifting and cross cutting 2017 feet at $11.11	21,215.29
Stoping 5591 fathoms	54,659.22
Sundry labor, etc	681.76
Supplies and fuel	15,334.83
Surface expense	6 281.65
Stamp mill expense, 95,476 tons at 46 15c	44,063 11
Tram road expense, at 4·31c	4,121 34
Rock-house expense, 95,476 tons	14.423.94
General expense at mine and office	8,757.51
Total, $1.59 per ton mined	$220,729.58
To which is to be added smelting, freight, insurance expense, etc., paid in Boston	44,510.65
Or a grand total of	$265,240.23
Amount of rock hoisted	139,129 tons.
milled	95.476 "
fine copper produced	2,258 885 pounds.
Percentage of copper in "mineral"	81·90 per cent.
Pounds of fine copper per ton rock milled	23·66 pounds.
Percentage fine copper in ore milled	1·056
Total cost per pound fine copper	11 74 cents.
Average price received for copper	10·92 "
Highest price obtained per pound	11·50 "

CASH RECEIPTS AND EXPENDITURES FOR THE YEAR ENDED DECEMBER 31ST, 1886.

Cash on hand January 1st, 1885	$6,293.31
Cash received from sales copper, 2,299,685 pounds, at 10·920 cents	251,139.61
From sale silver	315.73
From interest	105.15
From loans	431,180 95
	$689,034.75

Contra.

Cash paid loans	$417,412.73
Mine agents' drafts	222,214.75
Smelting freight, copper charges, and brokerage	38.548 73
Interest, expense, insurance, storage, and taxes	10, 69.38
Cash on hand December 31st, 1885	689.16
	$689,034 75

ASSETS AND LIABILITIES, JANUARY 1ST, 1886.

Assets.

Cash on hand	$689.16
3,6,586 pounds copper at 11¼ cents	34 490.92
Supplies at mine	49,358 41
Notes receivable	9,090.40
Rock broken in the mine ready for hoisting, say 10,400 tons, valued at	10.000.00
	$103,628.89

Liabilities.

Mine agents' drafts	$19,963.35
Loans and bills payable	135,966.27
Liabilities at mine	28.063.16
Due for smelting and freight	4,881.11
	$188,873.89
Less assets	103 628.89
Balance liabilities December 31st, 1885	$85.245.00

To offset which, we have, exclusive of the mine, machinery, buildings, etc., valued at $127,202.71.

D. L. Demmon, Treasurer.

The efficient superintendent of the mine, Captain Johnson Vivian, gives in his report the following information concerning the mine work:

"No. 6 and 8 shafts have been sunk from the twelfth to the thirteenth level, and No. 10 from the ninth to a point 40 feet below.

"The lode in No. 6 shaft showed, from time to time, some good stamp work. No. 8 shaft, owing to the copper-bearing portion of the lode being near the hanging-wall, is poor; but by cross-cuttings west, at the bottom level, we found some ground that will pay to remove with stopes, and which is still showing quite well in all grades of mineral. We have opened by drifts north of No. 6 shaft, from the fifth to the twelfth level, with about the same success we met with in former years. The bunches of productive ground seem to be regular both in size and value. The eleventh, twelfth, and thirteenth levels have been extended south of No 8 shaft, in the aggregate, 540 feet, and the eleventh level has been opened south of No. 10 shaft, 80 feet. At some points in this part of the mine, as well as north of No. 6 shaft, the lode is showing some good stoping ground, while at other places the lode is very lean.

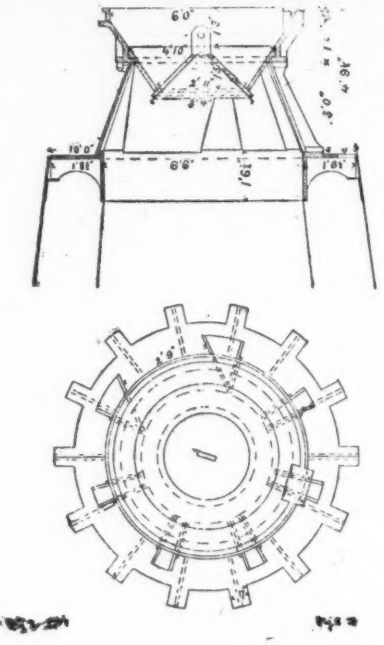
"Our openings are well ahead of the stopes, consequently we have no trouble to supply all the rock the mill can treat, and if we had another head of stamps, it could be kept running full-time on the same class of rock as we are now handling, which would doubtless make a product of from 175 to 180 tons a month, and leave, at present price for copper, a good profit.

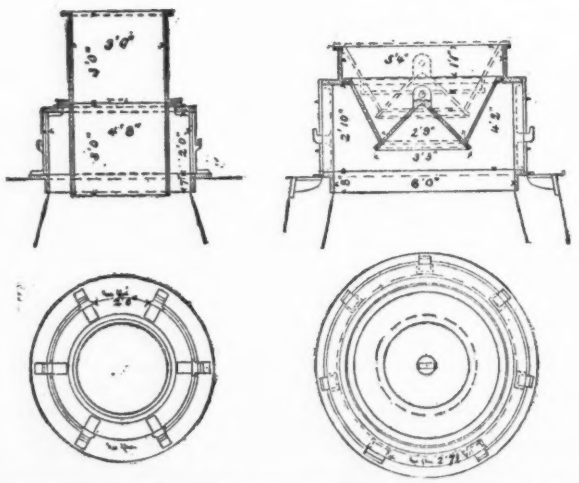
"All things considered, the prospects for the ensuing year were never better than they are to-day. If the mine continues to show as it does at this writing, and the machinery works well, as we have every reason to expect it will, a product of from 125 to 130 tons of copper per month can be kept up, which will give us a little profit."

THE MANUFACTURE OF SPIEGEL FROM FRANKLINITE RESIDUUM.

Written for the Engineering and Mining Journal by George C. Stone, Engineer of the New Jersey Zinc Company.

The Furnace Tops.—I can not say what style of tops the first furnaces had, as all the old drawings have disappeared. All the furnaces had tops like Fig. 1 when I first came to the works. The entire top castings rested on a foundation ring, which rested on the lining. On this ring, were six uprights, on which rested a second ring that supported the charging-cylinder, which was made in two sections. Between two pairs of the uprights, were the gas-flue openings, each two feet square. The remainder of the openings between the uprights was closed by curved





The cuts herewith given should have accompanied the illustrations on page 209 of this Journal, but were received too late for insertion at the time.

cast-iron doors held in place by keys fitting in the lugs shown on the uprights. These doors were opened to clean out the oxide that collected between the cylinder and walls. The Lehigh and Passaic companies' furnaces have tops similar to this, except that at the Lehigh furnace the top of the cylinder is closed by two hinged covers, and at the Passaic by a bell and hopper.

Fig. 2 shows the top of the first closed-top furnace "B." The general arrangement is the same, except that the hopper hangs in place of the lower section of the charging-cylinder. In this furnace, the foundation ring for the top castings rests on brackets bolted to the shell instead of resting directly on the brick-work. This arrangement admits of relining the furnace without removing the top castings. The upper bell and hopper, shown in dotted lines, are a new arrangement we are now making.

The top of furnace "A," Fig. 3, is quite a different arrangement. The foundation ring is much wider, being prolonged to form brackets, which rest on an angle iron riveted to the inside of the shell. This ring is much deeper than the others, to better protect the brick-work; our experience with furnace "B" having shown that, with the closed-top furnaces, the oxide on the throat was so much harder that it was difficult to remove it without injuring the brick.

Origin of Sulphur in Coal.—M. Dieulefait has been inquiring why there is so much sulphur in stone coal, and why there is so little of free alkaline carbonates in the ashes. For this purpose, he has analyzed the surviving species of the families of the coal plants, particularly the *Equisetaceæ*, and has found in them a greater than usual proportion of sulphuric acid. Hence he deduces, as the answer to his questions, that the coal plants were more highly charged with sulphur than most existing plants, and that for that reason their alkaline constituents assumed the forms of sulphates instead of carbonates.

CARLETON'S FIRE-DAMP INDICATOR.

This apparatus for indicating fire-damp was invented by Henry Guy Carleton, of New York. It consists, essentially, of one or more indicating balances to be permanently placed in a goaf or drift of the mine, and a registering balance to be used by the observer in the testing-room, connected by well insulated wires. Each balance holds in equilibrium a thin glass bulb of about 300 cubic inches' capacity, hermetically sealed. They are counterbalanced at the same moment by the weights *W* and *W'*, respectively, as shown in the accompanying illustrations, and hence will be equally affected by future variations in the atmospheric pressure Attached to the vertical arm or pointer *H* of each balance is a soft iron needle *d*, gilded to prevent rusting. Its ends plunge freely into helices of insulated wire, *a* and *b*.

The helices on both instruments are exactly of the same size and electrical resistance, and of sufficient internal diameter to exert but feeble influence on the needles with an ordinary current. The right-hand helix of balance No. 1 is connected with the right-hand helix of balance No. 2, and is supplied at will from the battery *I I* with a current whose strength can be lessened gradually and delicately by resistances thrown into the circuit by the rheostat, enabling the magnetic force of the helices to be regulated to a nicety. The left-hand helices are similarly connected through battery *I* and rheostat.

The vertical arm *H* of balance No. 2 has a platinum tip capable of electrical contact with the insulated screw *c*. Connection from binding-post 4 to the vertical arm is made by means of the mercury-cup *m*, into which a wire from the beam is dipped. By contact between *H* and *c*, the relay in the observing-room is kept closed. Breaking contact opens the relay, whose back-stroke shunts the local circuit on the bell, ringing it continuously. The resistance coil *g*, connected with binding-posts 3 and 4, prevents a spark passing when *H* and *c* break. The case surrounding balance No. 2 is of marble or unglazed tiling, excluding air currents and dust, yet admitting gases by diffusion. Chloride of calcium, in the holder *D'*, keeps the interior free from moisture. The whole is protected from injury by a perforated iron case, as shown. Once placed in its position in the mine, its temperature will be constant.

Balance No. 1, in the observing-room, is provided with two riders, moved along the graduated beam as shown. If more delicate readings are desired, additional riders of less weight may be also employed, a separate way being provided on the beam. Balance No. 1 is incased, dried by chloride of calcium, and placed in a room artificially maintained at constant temperature by means well known.

By this arrangement, it will be seen :

1st. That as the two bulbs *S S'* are equal in bulk, and balanced at the same moment, they will be affected equally in weight by an increase or decrease in atmospheric pressure.

2d. That the right-hand helix of each instrument will exert the same amount of force on its responsive needle, both being supplied with current from the same battery, and that the same rule will apply to the left-hand helices.

3d. That as each instrument is kept in an atmosphere of constant temperature and equal hygrometric condition, it will only be sensitive to a change in the pressure of said atmosphere or a change in its atomic weight.

Both instruments are balanced at the same moment by their weights *W W'* respectively. The case of balance No. 2 is then filled with pure fire-damp at normal pressure, obtained from a "blower" in the mine. (This will obviate the necessity of correcting for that percentage of carbonic acid always associated with marsh-gas in fire-damp, as would be necessary if pure marsh-gas were used.)

Care, of course, is taken to keep a stream of the gas flowing in, to counteract the diffusion of air through the case. Bulb *S'* will now sink, its increase in weight being about 39 grains, *H* will break contact with *c*, and the bell rings. The observer now switches on battery *I*, which applies a force of say 45 grains through helix *a'* to the needle attached to the vertical arm of balance No. 2. This more than compensates for the increase in weight, *H* is brought back to *c*, and the bell ceases to ring. The observer now throws in small resistances until *H* breaks again, and thus finally satisfies himself that the amount of force applied through helix *a'* of the distant instrument is just enough to balance it and no more. Now, as this amount of force is also exerted by helix *a* upon the needle of balance No. 1, its equilibrium is disturbed. Rider *r* is therefore shifted until equilibrium is restored. The position of this rider equals the force applied through helix *a* ; equals the force applied through the helix of the distant instrument, No. 2; and necessarily equals the increased weight of the bulb *S'* in pure fire-damp. From this point, therefore, to zero, the observer graduates his beam into hundredths and minor subdivisions. The graduation is then made in similar manner for carbonic acid, employing rider *r'* and battery *I I*. In practice, these graduations would be made before the instruments were placed in position, allowances being made for the depth and increased temperature to which each balance is to go.

Thus adjusted, the instrument will act under the conditions named as follows :

1. *Rising Barometer and no "Fire-Damp."* 2. *Falling Barometer and no "Fire-Damp."* 3. *Rising Barometer and "Fire-Damp."* 4. *Falling Barometer and "Fire-Damp."*

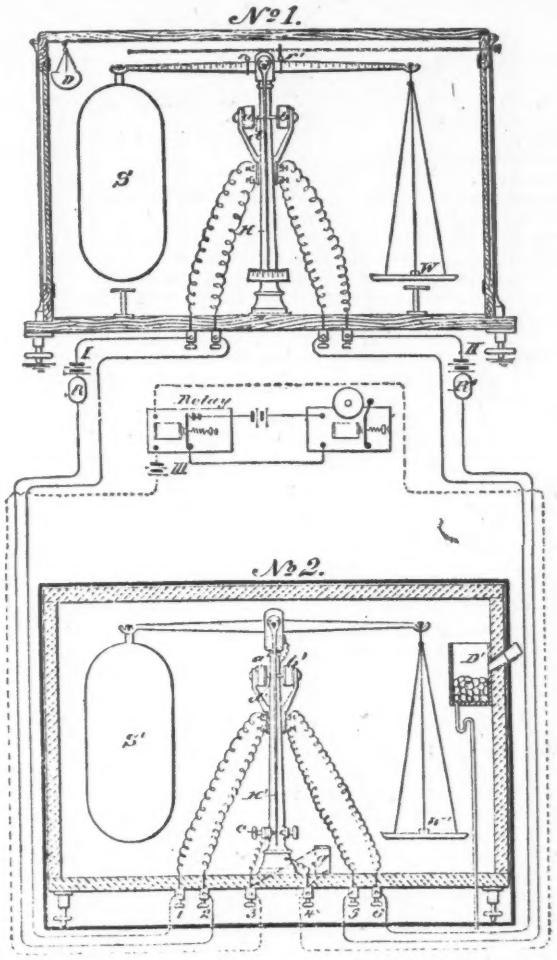
NOTES.

1. The percentage of carbonic acid exhaled from coal usually runs from 0·30 to 2·1 per cent in fire-damp, varying in different mines, but practically constant in any one. There may be a sudden increase by an explosion, but ventilation would soon restore the normal condition. The quantity produced by the lamps and men is insignificant, since the ventilation necessary to keep the mine free from fire-damp sweeps away the carbonic acid from this source as fast as formed.

2. Should it be desirable to test for marsh-gas only, balance 2 may be surrounded by an air-tight case, provided with a tube opened or shut at will by a mercury valve operated by an electro-magnet controlled from the observing station. This tube would be opened for say five minutes. During that time, the external gases would diffuse perfectly through the tube into the case, but both moisture and carbonic acid would be immediately absorbed by caustic potassa placed in *D'*. The tube would then be closed, and measurements taken, pure marsh-gas being the standard. These tests would be made as often as desired, the observer having full control of the valves on all the instruments and operating all on one circuit.

3. While a separate circuit is shown for the right-hand or left-hand helices, it is practicable, by a simple device arranged by the inventor, to operate either helix at will from the observing station, and yet use but a single circuit.

4. With bulbs of 300 cubic inches' capacity, a balance weighing to $\frac{1}{10}$ of a grain will give the percentage of marsh-gas to $\frac{1}{5}$ of one per cent. The



bulbs weigh 6 ounces. This weight may be lessened 86 grains by filling them with pure hydrogen. A reading to $\frac{1}{4}$ of one per cent is close enough in practice.

5. The instrument is especially designed for use in goaves where large accumulations of the gas are more liable to form. A decrease in atmospheric pressure forces it out in the workings, where it may be fired by a shot, a defective lamp, or other causes. It having been settled that the explosions supposed to be wholly due to coal-dust depend on marsh-gas in conjunction with the dust, the necessity for close watch upon even small percentages is obvious.

6. As marsh-gas spreads with tolerable rapidity, one instrument will guard a considerable area, especially in a goaf where ventilation is neglected.

THE LARGEST STEEL RAIL MILL RECORD.

Mr. E. C. Potter, Superintendent of the North Chicago Rolling-Mill Company, advises us of the following magnificent "record :"

"April 2d, on the day turn we rolled 1606 60-pound rails, weighing 426 gross tons, and lost one hour and thirty-five minutes. On the night turn, we rolled 1212 60 pound rails, weighing 320 gross tons, and lost three hours waiting for steel and changing rolls. Total for twenty-four hours, 2818 rails, weighing 746 gross tons, with four hours and thirty-five minutes idle time."

THE STEELTON, PA., RECORD.

The month of March has placed the Pennsylvania Steel-Works, Steelton, Pa., at the head of the column as the largest producing steel plant in the United States, and the record of the Bessemer mill for the month has not been equaled in this country. There was no special exertion made to accomplish the result, and only the usual complement of men was employed. The production of each week was as follows :

	Tons.		Tons.
First week	4 527	Fourth week	4,761
Second week	4,531	Three days	2,392
Third week	4,651		
Total			20,862

During the month, the following large productions were made by the different turns in twenty-four hours: 926 tons, 857 tons, 900 tons, and 854 tons.

The mill for several days did some extraordinary running, and from six o'clock P.M. on March 8th to six o'clock on March 9th, made the largest twenty-four-hour run ever made on a 56-pound rail; 2810 rails

were rolled, making 702 tons. The mill lost two hours and five minutes in running—the actual running time being 21 hours and 55 minutes.

The Joliet mill reported, on January 2d, 3000 rails, or about 900 tons, in twenty-four hours. If no time was lost, this is not as good as Harrisburg by say three rails an hour for actual running time.

On January 28th, in one turn of twelve hours, Joliet made 1658 rails, 52 pounds, with 85 minutes spare time, and on the 29th, 1758 rails, with 105 minutes' spare time. The twenty-four-hour work of Joliet should be given to make comparison possible.

All of these records are simply marvelous, and reflect the highest credit upon those making them.

WIRE ROPE HAULAGE MACHINERY OF WEBSTER, CAMP & LANE, AKRON, OHIO.

There are four systems of underground haulage in practical use:

1. By mules or horses.
2. By locomotive.
3. By endless rope or chain.
4. By tail rope.

Each system is adapted to certain conditions, to which the others will not so well apply, but at the same time, there are many cases where they are applied injudiciously, and many where one or the other might be applied with great advantage over haulage by horses or mules.

Unfortunately, no reliable investigations of the relative cost of moving loads by each of these systems have been made in this country, and the classic report of the English tail rope committee in 1868 is still the best we have. According to this report, the average cost of haulage per ton-mile was 1·879 pence, say 3¾ cents, by the tail rope system; 1·379 pence, say 2¾ cents, by the endless chain; and about 4 cents per ton-mile by the endless rope.

The averages obtained have been reduced and modified since that date, and the general impression appears now to favor the tail rope system.

ARRANGEMENT OF TAIL ROPE PLANT.

The tail rope system is thus far the favorite one for underground haulage on account of the almost endless variety of circumstances under which it may be applied, and its comparative simplicity of working. The main or hauling rope is wound upon one drum, and, leading in the center of the track, is attached to the front end of the train. No matter how many side-entries are worked by this same plant, one hauling rope does the work and without any couplings. The rope should be from ¾ to ⅞ inch diameter, seven wires to the strand. Attached to the rear end of the train is the tail rope, which is double the length of the main rope, as it must reach to the rear end of the haul and back again to wind on the other drum.

Where more than one entry is worked by this method, a coupling must be placed in the tail rope at the point *D*, Fig. 2. When not in use, the rope lies in the entry with both ends at *D*, one end ready to attach to train, the other to the tail rope, connected with the drum. When the side-entry is in use, the tail rope in the main entry, beyond this point, lies idle in the same way. Thus it will be observed that each side-entry has its own tail rope, and that there must be a coupling in the return tail rope, opposite this entry, when the train stands at this point.

The end elevation, Fig. 2, shows rollers for the main rope, also for the return tail rope, which should, for convenience, run as close to the wall as possible. Placing the tail rope sheaves overhead, over the center of track, is not to be recommended, as it is a constant source of annoyance. The rollers used are usually made of gum-wood, although hard maple is sometimes used. The bearings are sometimes of wood, but better of iron.

In Fig 2 are shown two plans for the location of the tail sheave. In the main entry, the sheave *C* is set under the track, which has the advantage of being entirely out of the way, although the pit must be kept thoroughly drained. The tail rope at the side of the entry leads over a 12-inch sheave, and directly on and around the tail sheave and out again between the two tracks. If the switch is located on the other side of the track, as shown at *B*, it is not desirable to carry the tail rope under the track at the parting, but it may be led up gradually, as shown in the elevation, Fig. 2, until at the parting it passes overhead between the two tracks, and on the tail sheave that is located vertically between the tracks. As this is placed back of the end of the train, there is always room to pass each side of it.

A machine of the average size, with 12-inch by 15-inch double cylinders, will pull from 30 to 50 loaded cars (varying with grade and condition of track), at a rate of six miles an hour.

Fig. 1 will give a clear idea of the arrangement and detail of the tail rope machine manufactured by the Webster, Camp & Lane Machine Company, of Akron, Ohio. The machine is compactly built, and occupies less space than any other plant made to do the same work. The frame is deep and strong, and the engines firmly fastened to it by fitted bolts. A center bearing is placed on engine-shaft, close to the pinion. Both drums are loose on the shaft with their bearings bushed with taper composition bushings, which may be removed for renewal.

The drums are started by means of the band friction driver, which is fast on the drum-shaft, and the bands on each drum are tightened or loosened by means of the large hand wheels. The brake bands, shown in Fig. 1, are operated by means of the lower hand wheels.

Purification of Sulphuric Acid.—Prof. Kupferschlaeger, in the *Bulletin de la Société Chimique de Paris*, says: All chemists know that commercial sulphuric acid, prepared from iron pyrites, contains lead and calcium sulphates, nitrous and sulphurous vapors, arsenic acid, sometimes selenious acid, thallium sulphate, and hydrogen fluoride. For its purification, he dilutes it with its own weight of water, then passes through it in excess a current of washed sulphurous acid, so as to bring the arsenic and nitric acids to a lower stage of oxidation, and to reduce selenious acid, if present. A current of hydrogen sulphide is then passed through it twice, with an interval, each time as long as it is absorbed. The vessel is then closed, and allowed to stand for some time at a moderate temperature, so that the lead and arsenic sulphides, selenium, etc., may subside. The sulphuric acid is then rectified in glass retorts, applying the heat so as to reach the upper portion only.

THE VOLCANOES OF HAWAII.

The island of Hawaii, the largest of the Sandwich Islands, appears to be simply an accumulation of lava thrown out from the four craters which have made it famous. There are three volcanic peaks on the island—Mauna Kea, the highest, rising to a hight 13,853 feet above the sea; Mauna Loa, the most active, is 13,760 feet high; and Mauna Hualalai, 7822 feet.

On the southeast slope of Mauna Loa, at 3970 feet above the sea and 16 miles from the main crater, is the wonderful crater of Kilauea. According to Professor Dana, the summit crater of Mauna Loa is of elliptic form, measuring 13,000 feet in its longest diameter and 780 feet in depth. The great crater of Kilauea, which has recently "caved in," is 16,000 feet in length, 7½ miles in circuit, nearly 4 square miles in area, and from 600 to 1000 feet deep. Its bottom appears as a broad plane, interspersed with lakes of boiling lava and jets of vapors. The liquid molten lava rises in these lakes until it overflows their banks, or, bursting through, escapes by large fissures down the mountain side. Nevertheless, these eruptions have usually been free from the explosions that characterize the eruptions of most other volcanoes.

In 1840, a large eruption in Kilauea began noiselessly and ran in a mighty stream to the sea, a distance of 40 miles from the crater. In 1843, a lava stream broke out without noise about 700 feet below the summit of Mauna Loa, and therefore far above the crater of Kilauea, which remained quiescent, and flowed to a distance of 30 miles. In 1852, another outburst of lava occurred noiselessly on the side of Mauna Loa, at a hight of 10,000 feet above the sea, and, as described by the Rev. T. Coan, it appeared as a fountain of fiery lava 1000 feet broad, playing to a hight of 700 feet, and presented a spectacle of indescribable grandeur and brilliancy. In 1855, another eruption commenced, without noise or shaking, at a hight of 12,000 feet, and for a year and a half the flood continued until it reached a length of 60 miles; and in 1859, Mauna Loa again sent up from a fissure near its summit a fiery fountain of molten lava to a height of 400 feet, and the fiery river ran down the mountain sides until it lost itself in the ocean, 50 miles from its source. After this, the mountain remained quiet for nine years, until in 1868 the whole island was shaken "like the lid of a boiling pot," when suddenly several streams of lava burst through the sides of the mountain and ran into the sea. At that time, Kilauea was violently agitated and the great plane of its crater much broken up. This brief account of previous eruptions of these famous volcanoes shows that, near as these two volcanoes are together, they appear to be vents from separate laboratories; for it has usually been the high mountain that overflowed, while the great crater at its base remained undisturbed.

The following extract from Captain C. E. Dutton's report on Hawaiian volcanoes gives some further particulars concerning this volcano:

Appended is a copy of the extract, which gives a history and description of the caldera of Kilauea: "The lava pool called New Lake was formed in 1882, and became enlarged by the gradual clearing off and engulfment of successive slices of its encircling wall. Lava lakes do not, as a rule, maintain any constant position. Five or six lakes were known in the floor of Kilauea in 1853. In 1878, a large open lake existed near the north end of the pit, but its location is no longer discernible. There was also a large southern lake. In truth, the floor of the caldera is liable to open and become a lava pool at any point, and the changes have been very great in historic times. Halemaumau seems to be what remains of the great central lake of Kilauea, as seen by Ellis in 1823. As we pass from the new lake to Halemaumau, we have abundant evidence that we are treading upon the thin crust of a slumbering volcano. Numerous cracks on either hand emit steam and sulphurous vapors. A stick plunged into one of the cracks is soon charred. Signs of instability, such as shattering and heaving movements, are seen all around, and the thoughts of a catastrophe are ever before the mind." It is this portion of the floor of the volcano that has now caved in, forming a vast chasm of inconceivable depth and dimensions. The following description of this latest convulsion is given in the *Alta* of San Francisco:

"On the morning of March 6th, both Halemaumau and New Lake, the two active lakes within the large crater, were unusually full and demonstrative, and continued so until half-past nine P.M. of the same day, when a series of earthquakes began which lasted until past seven o'clock the following morning. During that time, 43 distinct shocks of an unusually heavy character were counted. After the first four or five shocks, the fires in New Lake had all disappeared, and about three o'clock in the morning the great light from Halemaumau's boiling flood also went out. The situation of the people in the Volcano House was, indeed, a precarious one, and all night long they paced the sitting-room floor in an agony of suspense, not knowing what would occur next, or what moment would be their last on earth.

"When the morning dawned, and the smoke and mist had cleared away, the frightened men plucked up courage and started out on a tour of inspection. The bluffs, or mammoth piles of cold lava, which had surrounded the two lakes, had vanished from sight, and the floor of the crater, for some distance around the places where the lakes were seen in active operation the day before, had all caved in, forming one vast chasm, or bottomless pit, in which no sign of fire was visible. The great black hole seemed to extend into the very bowels of the earth, and when lumps of lava were thrown down, no answering sound or echo arose to indicate that they had struck the bottom, if bottom there was. Several rents were also discovered in the earth, outside of the crater, and on the road to Keauhou were found three great fissures of remarkable breadth and depth. Two of these extended right across the road and had to be bridged over before travelers could pass. The other was a large hole where there had formerly been a cave, and the road-bed was entirely caved in, compelling the cutting of a new path around it.

"This sudden extinction of the great fires of Kilauea is looked upon by the Hawaiians as being ominous of a terrible eruption from the volcano on the summit of Mauna Loa, the large mountain that towers some five or six thousand feet above Kilauea. This crater has long been considered almost extinct, but the startling action of Kilauea would indicate that the fires beneath had found some other channel, and the most likely outlet would be through the crater of Mauna Loa. The contemplation of any other possibility would be terrifying indeed for the inhabitants of that endangered island."

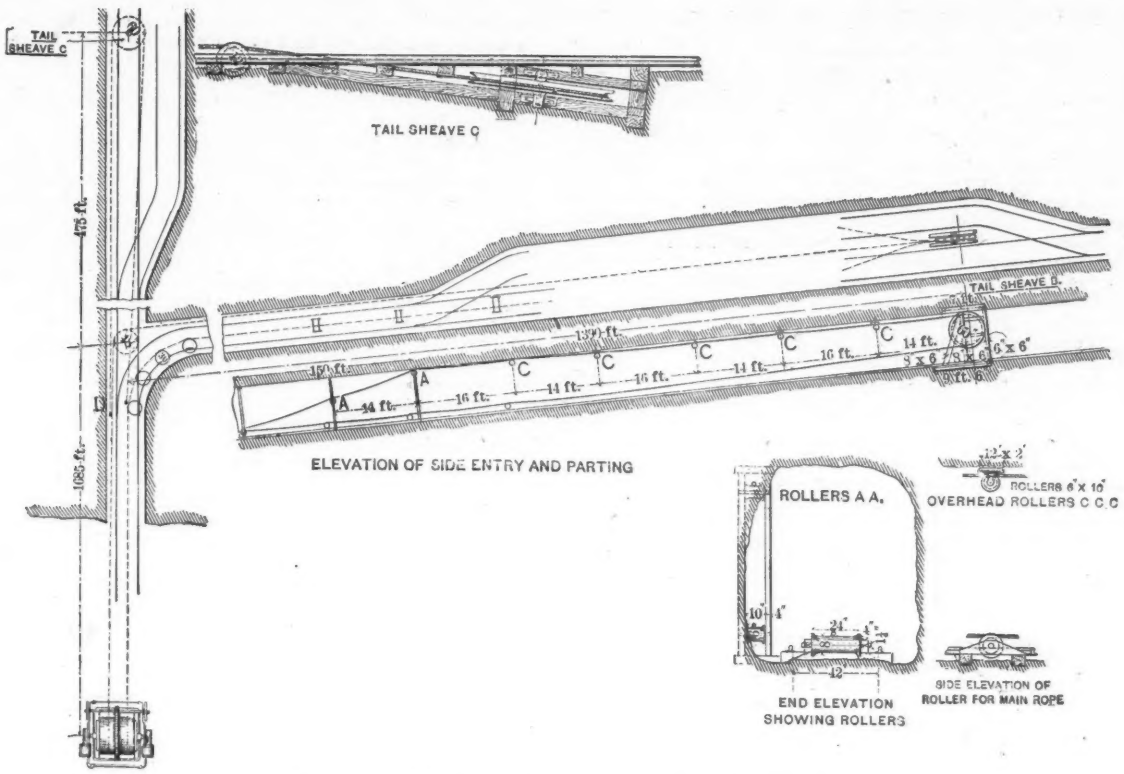


Fig. 2.—Tail Rope Plant for Working Side-Entries.

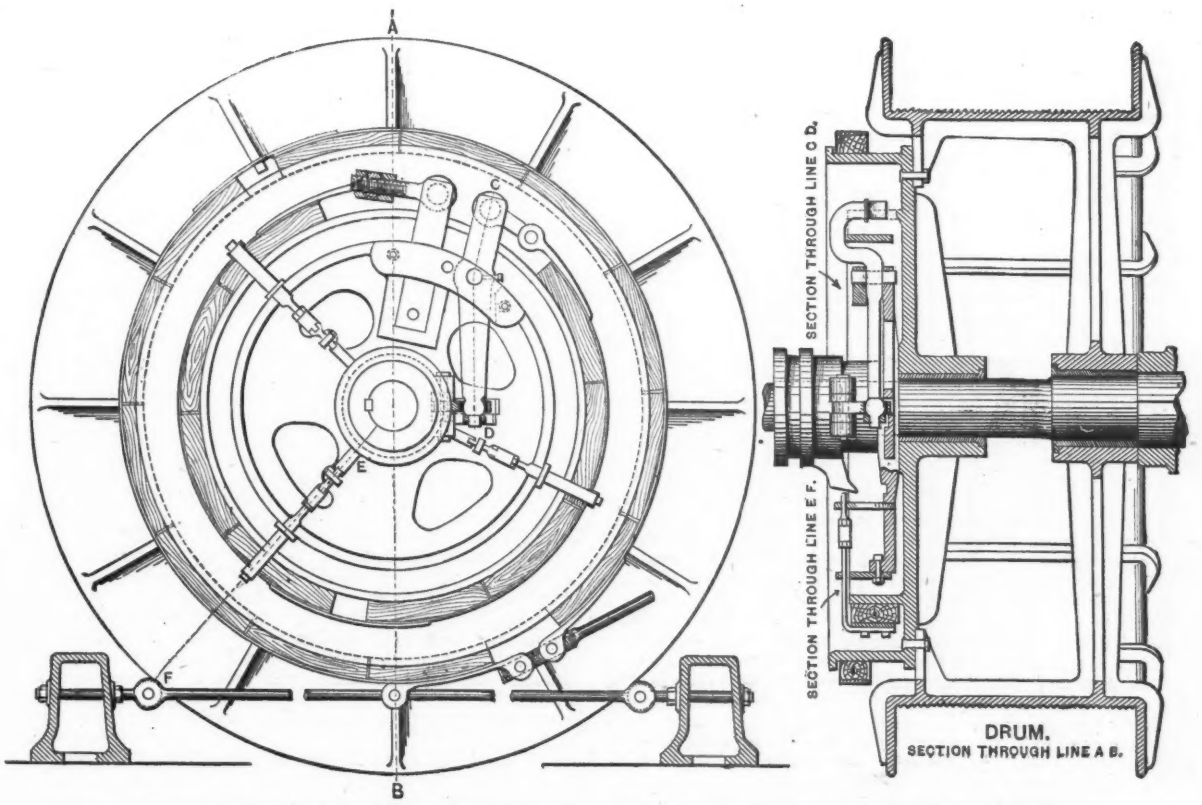


Fig. 1.—Details of Tail Rope Haulage Machine—Side Elevation and Section of Drum.

A Remarkable Coal Output Record.—At the No. 2 Shaft of the Excelsior Coal Company's mines at Excelsior, Iowa, owned by the Chicago, Milwaukee & St. Paul Railroad, and under the management of Mr. Benjamin Wightman, General Superintendent, during a recent ten hours' run there were mined, screened, and loaded out of one shaft and over one pair of scales, 1727 tons of lump coal, filling 121 cars, while the total of lump and nut together would not vary materially from 2000 tons for the total day's output. This, so far as the parties have knowledge, is the largest ten hours' output of soft coal on record in the United States, under similar circumstances, particularly considering the fact of their having averaged a daily output of about 1150 tons of lump, both before and since, with no especial preparation for a heavy run upon that day. At this shaft, the company uses engines manufactured by the Ottumwa Iron-Works, of Ottumwa, Iowa, consisting of a double hauling-engine with cylinders 12 by 16, and 4 iron drums 48 inches in diameter, with a capacity of 5000 feet of rope, each provided with clutches and brakes and an automatic index for showing the location of the train. Also, a pair of double hoisters with cylinders 12 by 20, and operating appliances.

THE METALLURGY OF SAN JUAN COUNTY (COLO.) ORES.

Written for the Engineering and Mining Journal by Prof. Theodore B. Comstock.

Concentration in the Sulphuret Zone.

Although this belt lies almost wholly outside the limits of San Juan County, the relations are so close that it would not be proper to omit a general review of the products.

The ores of this district are chiefly of a class that can not be considered well adapted to concentration, and yet the fact is patent that they have been thus beneficiated, not merely successfully, but with notably good results. The reason for this, however, is to be found in the careful manner in which the leading mines classify their ores. The output being very largely, almost entirely, made up of "dry" minerals very rich in silver, the loss by concentration must necessarily be large, and fortunately, only a comparatively small proportion of the mine yield requires more than the ordinary hand assorting in connection with a rough screening and washing. This preliminary dressing is conducted in a simple and economical manner at the Sheridan mine, the inferior grades being sent to the Pandora mill, near Telluride, for further concentration. It may be said that the comparatively few but usually rich mines of this zone produce ores of such character that the naturally adverse concentrating qualities of the contained silver minerals are to a great extent offset by the texture of the vein-stuff. That is to say, the mineral occurs in patches in the gangue in such a manner as to make hand assorting practicable with comparatively slight loss. Such grades as are sent to mill can also be handled in such a way as to avoid much labor and machine work with decided advantage in the percentages of mineral saved. The same ore in an equivalent gangue would require much more delicate treatment without the possibility of similar profit, were the value disseminated in minute grains, as is the case in some other districts.

ADAPTABILITY OF VARIOUS METHODS OF ORE-REDUCTION.

It will be better to discuss each process by itself, with less reference to the six mineral zones *per se*, because, after the ores have been beneficiated by dressing, they are in condition to be transported, and it is not usually economical for the mines to further manipulate their own product.

1. *Smelting Ores.*—While the cleanest and most desirable galenas come from the limited area of the *argentiferous galena* zone and from the heart of the *galena-gray copper* zone, we have seen that no class of ores is less restricted in this region; hence, it may be inferred that smelters are the most generally applicable metallurgical plants for San Juan County ores. And this deduction is just, in a measure. Nevertheless, only one smelter has been able to succeed in a business way in this region, and there have been periods when that has come very close to a different result. Two factors have kept it alive, either one of which could not have held its own without the aid of the other. Both combined have not heretofore existed in any other smelter in the district, and it is admitted by the very ones who have succeeded in this enterprise at Durango, in another county, that smelting under the most favorable conditions is not feasible within the limits of San Juan County itself. Skilled management and good financial support have here combined to make a fair success in the face of other conditions that are not the most favorable. But the one great advantage of Durango as a smelting point is its fuel supply. The strong and close competition of the near future will, however, gradually narrow the margin of profit, until nothing but the possession of an individual ore-supply will enable the works to survive.

Many worthy people are unable yet to believe that Silverton and Animas Forks and other localities are not the best places in the world for smelters. Such persons argue very truly that mismanagement has caused each plant of the kind to succumb heretofore; but they overlook the important fact that the mismanagement began in the effort to smelt ores in that section. Any one who knows the facts and understands the actual cost of smelting can readily estimate how much more he is getting to-day for his ores from Denver and Pueblo buyers than would be possible for a local smelter to pay without loss.

But it is equally wrong to consider that, for many of the products of this region, some other process must, for this reason, be introduced. Smelting is the only method of reduction suitable for the economical treatment of a large portion of the output, and just now there is a fair market at the valley smelting points for the best grades of ores of the non-smelting varieties also, such as *tetrahedrite*, etc. (gray copper), *stephanite* (brittle silver), and free gold ores. These are used to mix with galenas low in silver. Under existing circumstances, the smelters can afford to pay as much as any other works for them, or even more. The American and Royal Gorge Smelting-Works at Leadville and Cañon City have made especially good offers for such dry ores, which are particularly desirable to appreciate the value of the bullion from the carbonate ores forming their main supply.

This outlet for the very high-grade ores must be an uncertain one, however; for the demand depends very largely upon the state of the lead market. When the price of this metal is very low, as it was in 1884, the smelters do not care to produce it in any greater amount than is absolutely necessary. Their first efforts are then directed toward the acquisition of clean galenas rich in silver. At such times, the products of the *argentiferous galena zone* and the *galena-gray copper zone* are in great demand at unusually high prices. In 1884, for instance, as agent for Denver buyers, I was always able to pay from $2 to $4 a ton above the schedule rates for such ores as were mined in Arrastra Gulch and at Ophir from the galena mines. When, however, as at present, and in 1882, the price of lead is high, the works are not compelled to regard the silver contents quite as closely; for they can profitably market a bullion heavier in lead, or, what is almost the same thing, they can afford to work ores that produce more lead in proportion to the silver contained. This makes them less anxious to procure dry ores for mixtures and more eager to obtain the lower grades of lead ores.

Other things equal, this oscillation of conditions is of itself enough to throw the advantage all on the side of the valley smelters; for they have free choice of ores from the whole field.

It is very evident that all the smelting ores of this region must go elsewhere for treatment; for if it be possible, as I do not doubt in some cases, to reduce the lead ores by some one or other different method, there is certainly no process that now can compete in economy with smelting for them; and if there were any such method, it would succeed best where large capital, skilled labor, and free choice of raw material were combined with good markets for the inevitable by-products.

I do not overlook the fact that six smelters besides the one at Durango (to say nothing of the curious experiment with the Duryee furnace) have actually produced bullion successfully within the counties of Hinsdale, San Juan, and Dolores. These are often used as illustrations of the fallacy of such arguments as I have adduced; but they really afford the best possible proof of the soundness of my reasoning.

The Crooke smelter at Lake City was a partial success, just as was the old Greene smelter at Silverton, and as the Grand View and Pasadena smelters at Rico have been, I believe. They were able to exist as long as the cost of transportation of ores to distant points was so costly that the miner with very high-grade ore could better afford to pay the enormous charges for treatment than to ship to Denver or Pueblo at the still higher rates of carriage to the outside smelters. Lake City and Silverton have ceased to be profitable smelting points (none of this work has been done since 1882), and Rico, with additional advantages similar to those at Durango, is still shut in enough to give slight opportunity for profit, which will probably continue but a short time. All these points have proved ill-fitted for such works by reason of the small chance for obtaining a steady ore-supply of suitable quality for even mixtures. Rico is the last to succumb, because her transportation facilities are most limited, while her adjacent supply of ores, fuel, and fluxes is the most advantageous. The Martha Rose smelter, at Silverton, and the Cherry Smelter, near Animas Forks, were run successfully by Oliver Mathews, in a metallurgical way, much to his credit; but he never acknowledged any responsibility for financial success, which could not be accomplished with the support given him, nor with the ores brought to the works, at the prices paid for them.

This disposes of the claim that ores can be smelted with profit in this district, though the argument is not needed to convince any one at all familiar with the facts and the principles of metallurgy involved in the case.

CHAMPAIGN, ILL., March 8.

THE AMMONIA-SODA PROCESS.

In the *Journal of the Society of Chemical Industry* for September there is a very interesting article, by Dr. Ludwig Mond, on the origin and development of the ammonia-soda process, which, *Engineering* says, is so immensely affecting one of the greatest English industries, and which threatens with extinction some of the largest works in the country. It was only to be expected that so successful and vastly important an invention should be claimed in more than one quarter, and it appears that quite recently very good authority has been put forward in support of the contention that the honor was due to French chemists, and thus that, if the old soda process of Leblanc was to be superseded, the victorious successor was equally the product of French skill and knowledge. But this claim appears to be totally unfounded, if we may judge by the array of facts and specifications, with exact dates, which Mr. Mond puts forward. These facts and figures are not only interesting as settling the question as to the origin of the conception of the process, but are also exceedingly curious as showing how long a piece of chemical knowledge, complete almost to the latest details, may remain practically unavailable till some inventor, more practical and more pertinacious than his predecessors, comes forward and shows the exact means, as to apparatus and appliances, that will enable this chemical knowledge to be carried out in practice on the grandest manufacturing scale. In the present instance, it was Mr. Ernest Solvay who overcame all the difficulties and first made the process really applicable on the large scale. It appears that the first notice of the process is in an English specification by Dyar and Hemming in 1838. The first specification, although it deals with the reaction between common salt and ammonium carbonate, which is, of course, the basis of the process, yet proposed to do so in such a manner that, as is now known, the process could never have been economically carried out, owing to loss of ammonia. This first specification was repeated exactly in a French patent, one year later, taken out by Delaunay, acting as agent for Dyar and Hemming. In 1840, this first French patent is followed by an additional one, which is allowed almost free of expense by French law, but would cost a great deal in this country. In this case, it would appear that Dyar and Hemming found out certain very great improvements in the process soon after taking out their first patent in England, and that they protected these improvements in France, but did not do so in England, owing to the expense. Although the first patent of Dyar and Hemming is the earliest recorded attempt to base a manufacture on the reaction concerned, yet they could hardly be looked upon as the inventors of the industry now so extensive, had they not gone beyond their first specification. But the improvements above spoken of carry the matter so much farther that what they there state and claim practically covers the entire chemistry of the process as now worked. Though the manufacture was not a success till 1865, in spite of numerous and costly attempts by many manufacturers, this long interval of failure was due to the mechanical and not to the chemical side of the question. The claim that has been put forward for French chemists is based upon patents taken out in 1854 by Schloesing, and by Schloesing and Rolland in 1858. It appears that these gentlemen themselves have always acknowledged that they were only trying to improve the process as described by Delaunay, after Dyar and Hemming, and that the claim for priority was only put forward by others on their behalf. As concerns the simple chemical fact that bicarbonate of sodium results when a solution of salt is mixed with ammonium carbonate, this was known long before Dyar and Hemming took out their patent, though it was never published. It is mentioned in the note-book of the chemist Vogel as far back as 1822, and the late Dr. Angus Smith told Mr. Mond that the reaction had been shown to him by Mr. John Thom; several years before 1838. Letters of Mr. Thom show that he actually manufactured soda in this manner at works where he was chemist as far back as 1836. But he did this in such a crude and commercially impracticable manner that no extensive manufacture could be based upon his process, and what he did in no way detracts from the position of Dyar and Hemming as inventors of the method now in use.

THE COUNCIL OF ENGINEERING SOCIETIES ON NATIONAL PUBLIC WORKS.

This is the title of a new organization, said to represent twenty-one societies of civil engineers scattered throughout the country. The objects of the "council," etc., are stated in the following articles of organization, which were adopted at a recent meeting in Cleveland, Ohio:

"1. That the organization be called the Council of Engineering Societies on National Public Works.

"2. Its object is to promote an improved system of national public works.

"3. The membership shall be composed of the members of the committees on national public works of the several engineering societies in the United States, provided that each committee shall be entitled to but one vote. Past delegates and all engineers interested in the promotion of the objects of this council may become associate members hereof with all the privileges of members except that of voting.

"4. The officers of this council shall consist of a president, a vice-president, a secretary, who shall also act as treasurer, and an executive board of seven members, including the president and vice-president.

"5. Meetings to be called by the president on the request of the executive board.

"6. The officers shall be elected at any regular meeting by ballot, for the period of one year or until their successors are elected. The executive board shall have power to fill, temporarily, any vacancy that may occur.

"7. Two thirds of the delegates reporting for any meeting shall constitute a quorum.

"8. The order of business shall be provided by the executive board.

"9. The articles of organization may be amended at any regular meeting, by a three-fourths majority of the members voting."

The chair appointed Messrs. Loweth, Searles, and Moore a committee upon nominations, and while waiting for the report the following report was read by Mr. Dempster, the chairman of the committee on the action of the convention:

"Your committee on action, fully recognizing the importance, magnitude, and difficulties of the work undertaken, present the following report: We recommend that the executive board collect from all sources within its reach such data as may afford the fullest information on the subject, and formulate a plan for the creation, maintenance, and operation of a bureau of national public works, as suggested in outline by the convention of December 5th, 1885, send copies of the same to all the societies represented in the council, and all others taking an interest therein, and, after allowing ample time for the consideration of the same, submit it to the councils for consideration and discussion at a meeting called for the purpose."

THE ORIGIN OF HUMAN RACES AND TYPES.

One of the most inexplicable subjects in the evolution of man, says *Science*, has been his racial persistency. The teachings of Agassiz are yet familiar, and the thorough and abundant testimony of Morton, Nott, and Gliddon has demonstrated the permanency of the great races of mankind. The peculiar physiognomy of the Jew stands out as clearly in the early Egyptian records as at the present day. Food, climate, the most diverse environmental conditions, all appear to cause but little modification in racial type. The evidence from his earliest known periods of existence throws but little light upon his immediate origin, and the opponents of evolution have long found great satisfaction in the few proofs of lower affinity that his fossil remains present. Certainly there must have been factors in his earliest development that we have not yet taken into account. When and where did the African, the Caucasian, the Malayan races first become fixed, and why have the causes that long ago led to their differentiation ceased to be active? An answer to this question, deserving consideration, has lately been attempted by Moritz Wagner (*Kosmos*, 1886, page 23).

It has long been recognized that one of the strongest factors in the artificial production of new varieties is in-and-in breeding, the repeated crossing, within narrow limits, of the progeny of related parents. It is rarely in any other way that the impression of peculiarities can be combined and not antagonized in the offspring. All breeders or growers are aware that the organism, be it vegetable or animal, acquires with every such repetition greater plasticity and capability of change, and that it can arrive at a considerable degree of differentiation only when free crossing is hindered or prevented for a sufficient length of time for these variations to become fixed and not dissipated. In nature, strong proof of the same law is afforded by the faunal and floral peculiarities of regions issolated by natural barriers. The Galapagos and the Hawaiian islands, notwithstanding the uniformity of climates and general conditions, show striking diversities in animal and plant life among themselves, the result of crossing among nearly related forms. Isolation, from whatever cause it may be due, throughout all animal and vegetable life, brings almost inevitably variation, due to the limitation of crossing, and the consequent fixation of characters.

But, in both of these respects, man has, in all his known history, been strikingly at variance with all other members of both the animal and vegetable kingdoms. In him alone, among all living creatures, exists the instinctive aversion to crossing between near blood-relations, an aversion that predominates in every grade of civilization, from the cultivated races to the Eskimo, Hottentot, or Australian. Indeed, among the lowest tribes, the aversion is often strongest, and incest not unfrequently is punished by death. Most assuredly, man will not form an exception to a law so potent for change among other animals; and we see, in this custom of marriage between those unrelated, the most important factor in the production of varieties removed, and we can understand the difficulty of the formation of new races. The very acceptance of man's origin recognizes the certainty that some time in his development this instinct has been acquired. In the earliest period, it did not exist, and he was then subject to the same laws of variation as the ape and the dog. It was to this period that the chief divisions of mankind evidently date.

Every thing goes to indicate that man's origin extends back far into the Pliocene age; and evidently in his early stages he differed little, in his habits, from wild animals of the forest. Without clothes or habitation, he depended upon the free gifts of nature for food and shelter; without family instincts, and, what seems to be a necessary concomitant, without any sexual aversions whatever. With the great climatic changes of the glacial period, all this was changed. The struggle for existence became bitter: sustenance, shelter, and clothes had then to be acquired by the exercise of brain and hand. Migrations to the most favored and isolated locations were the inevitable result, and the necessity of protection of offspring became the contingency of existence. Family life took the place of more brutal instincts, and the child remained longer dependent upon the parent. But with the constant association of near relatives, an aversion was acquired to close intermarriage, resulting in the custom, or rather instinct, that now characterizes all classes of mankind. The chief factor of change thus ceased its operation, but the formation of races had already occurred.

Thus the author would account for those primitive and wide divergences that must once have taken place. With his development and acquisition of language, man became the most cosmopolitan of animals; tendency to further divergence was checked, and is now rather toward homogeneity. Anthropologists are fast recognizing the futility of separating tribes and classes by cranial classification. Very great variations are found between dolichocephalic and brachycephalic types among all civilized or uncivilized races. The pure Germanic race of the blond type is disappearing, as Virchow has shown, and greater racial uniformity is becoming apparent. The larger part of the German people is a mixture between the light-skinned indigenous race and the dark-skinned Indo European races. Free crossing prevents the further formation of striking changes; but, with the development of civilization, a new and subordinate factor is taking, in a measure, its place, that of national and social caste, which tends to the formation of minor variations. The peasant and the noble, the Jew, the German, Frenchman, or Englishman, all are differentiated by very tangible characters, the result of partially restricted crossing, from social causes. Thus in man's history we see the unrestricted crossing of bestiality, fruitful in change; the acquired humane instincts averse to pairing between blood relations, and eager for remote and strange mates; and finally, the prejudices of social and political castes that lead to the formation of minor variations.

MOVEMENT OF BONDED METALS, PORT OF NEW YORK, MARCH, 1886.

From the Metal Exchange *Report* we take the following:

METALS.	Imports.		Warehoused.		Withdrawn.		Exports.		Stocks.
	Feb., 1886.	March, 1886.	Feb., 1886.	March, 1886.	Feb., 1886.	March, 1886.	Feb., 1886.	March, 1886.	April 1, 1886.
Tons.									
Pig-iron	3,47?	5,128	500	170	.....	.....	220	.....	1,409
Iron ore	2,947	2,3?5	.....	.....	.....	.....	.....	.....	.....
Spiegel iron	6,746	7,467	37	168	300	227	.....	.....	721
Old rails	3,438	4,988	.....	.....	.....	.....	.....	.....	3,780
Scrap iron	118	7 9	.....	349	.....	.....	.....	.....	553
Scrap steel	1,4?0	1,741	.....	.....	.....	.....	.....	.....	206
Steel blooms	253	1,29?	.....	.....	.....	.....	.....	.....	17
New steel r'ls	3?7	789	.....	.....	.....	.....	.....	.....	135
New iron r'ls	.....	.....	.....	.....	.....	.....	.....	.....	12
Steel wire rods	7,287	9,237	500	.....	605	125	.....	.....	3,004
Iron wire rods	182	190	.....	.....	101	.....	.....	.....	175
Swedish iron	1,710	1,387	.....	191	5	85	.....	.....	4,733
Iron bds and bars	8	11	17	.....	24	.....	77	141	.....
Iron beams	83	43	.....	.....	.....	.....	.....	.....	.....
Hoop iron	.....	.....	.....	.....	.....	.....	.....	.....	.....
Cotton ties	.....	.....	.....	.....	.....	.....	.....	.....	667
Sheet-iron	91	111	.....	.....	.....	.....	5	.....	42
Lbs.									
Russia sheet-iron	.....	.....	.....	.....	96,900	87,000	.....	.....	762
Steel bdls, bars, etc.	251	300	.....	.....	.....	.....	12	12	71
Steel tires & forgings	57	345	.....	.....	.....	.....	5	3	79
Iron tubes	4??	.....	.....	.....	.....	.....	.....	.....	.....
Boxes.									
Tin plates	130,680	177,527	7,297	8,939	10,719	17,658	218	1.9	43,501
Tons.									
Slab and ingot tin	697	974	.....	.....	.....	.....	lbs.1,461	.....	.....
Lbs.									
Ingot copper, matte, etc.	312,528	35,981	.....	.....	.....	.....	3,720,867	7,424,735	.....
Copper (old)	{ 1,692	{	.....	238	.....	6,380	.....	6,611	65,830
Brass (old)	{	{ 6,?29	.....	6,?29	.....	22,588	.....	28,449	tons 5
Lbs.	Tons.	Tons.	Lbs.						
Pig-lead	1,?10	1,266	1,524,280	1,202,837	116,289	1,?3?,?99	29,?60	95,175	2,?68,214
Lead (old)	.....	.....	.....	468	.....	.....	.....	.....	468
Tons.									
Spelter	110	167	55	55	118	.....	280	53	152
Sheet-zinc	99	159	.....	.....	.....	.....	lbs.6,720	1	lb.26,?13
Scrap "	.....	.....	.....	.....	.....	.....	.....	.....	lb.13,400
Csks.									
Rg. antim'ny Lbs.	299	319	.....	.....	25	.....	.....	.....	199
Nickel	21,551	37,550	.....	18,?30	.....	7,000	?6,?90	36,?00	17,412

PATENTS GRANTED BY THE UNITED STATES PATENT-OFFICE.

The following is a list of the patents relating to mining, metallurgy, and kindred subjects, issued by the United States Patent-Office.

GRANTED MARCH 30TH, 1886.

338,690. Fire-Bar for Liquid-Fuel Furnaces. Johan Fredrick Backlund, Stockholm Sweden, Assignor to Petter Osberg, same place.

338,722. Apparatus for the Manufacture of Iron and Steel. Eugene F. Falconnet, Nashville, Tenn., Assignor of one half to Henry M. Pierce, same place.

338,723. Process of Manufacturing Steel. Eugene F. Falconnet, Nashville, Tenn., Assignor of one half to Henry M. Pierce, same place.

338,772. Oil-Separator for Steam and Water. Eugen Polte, Magdeburg, Germany.

338,783. Pipe-Coupling. Benjamin F. Ritchie, Pittsburg, Pa., Assignor of one half to Jefferson Staley, same place.

338,847. Screen for Ores and Mineral Substances. S. R. Krom, Plainfield, New Jersey.

338,848. Flexible Joint or Connection-Pipe. Hippolyte Lecouteux and Emile Garnier, Paris, France.

338,856. Ore-Concentrator. Michael McAneny and William L. Rieley, Denver, Colo., Assignors, by direct and mesne assignments, of one half to William Thompson and John Livezey, Jr., both of same place.

338,857. Drill-Jar. James M. McCandlish, Bradford, Pa.

338,863. Ratchet Mining Drill. George W. Nixon, Rockwood, Assignor of one half to William M Nixon, Chattanooga, Tenn.

338,883. Combustion of Fluid Fuel for the Development of Steam. Lemuel W. Serrell, Plainfield, New Jersey.

338,907. Metallurgical Furnace. William Acheson, Pittsburg, Pa., Assignor of one fourth to William D. Young, same place.

338,913. Metal Rope. Telford Clarence Batchelor, West Kensington, County of Middlesex, England.

338,924. Manufacture of Blocks of Bicarbonate of Soda. James W. Carson, Philadelphia, Pa., and Francis P. Harned, Camden, New Jersey, Assignors to said James W. Carson.

338,989. Apparatus for the Manufacture of Illuminating and Heating Gas. Burdett Loomis, Hartford, Conn.

338,990. Process of Manufacturing Gas. Burdett Loomis, Hartford, Conn.

338,991. Apparatus for Manufacturing Gas. Burdett Loomis, Hartford, Conn.

338,992. Process of and Apparatus for Manufacturing Gas. Burdett Loomis, Hartford, Conn.

FURNACE, MILL, AND FACTORY.

The pulverizers made by the Griffin Manufacturing Company, No. 92 Liberty street, New York City, are running to entire satisfaction at different works in London, Dublin, and Vienna, on phosphates, cement, and limestone. Thorough tests of the machines have been made by the Bradley Fertilizer Company, of Boston, which has, in consequence, purchased two mills. In addition to this, sales have been made to some carbon companies and to mining companies. Among the latter, we may mention the Manganita Mining Company, of California, which has two mills in operation.

Messrs. P. Matheson & Son have decided to remove their tube and pipe-works from Middleton, Pa., to Youngstown, Ohio, the Ohio Gas and Fuel Company guaranteeing an ample supply of gas. This move will extend the facilities of the concern.

The Rand Drill Company, No. 23 Park Place, New York City, will issue, about May 1st, a new catalogue, containing new tables, information on shaft-sinking, drifting, etc.; also, a full account of work on Flood Rock, its excavation, and final explosion, with illustrations.

The Roller Chain Belting Company, of Columbus, Ohio, reports that its works are running full-time, with orders for chain elevators and drive-belts to keep it busy for some time yet. The demand for this machinery is steadily increasing.

The last of the fifty-four-ton breech-loading rifled cannon ordered by the United States government was cast at the South Boston Iron-Works, Boston, Mass., on the 5th inst. Three attempts had been previously made to cast this huge cannon, but all were unsuccessful. It is, however, thought that the last attempt will be attended with different results. About 105 tons of iron were used in the operation.

The nail manufacturers will hold their next meeting in Wheeling, West Va., April 14th.

The building of the new steel plant of Carnegie, Phipps & Co., adjoining their present works at Homestead, Pa., will soon begin. The plant is to consist of four 30-ton open-hearth furnaces, a plate mill, and a shearing department. The furnaces will each have a weekly capacity of 900 tons of ingots. The plate mill and engine will be furnished and built by McIntosh, Hemphill & Co., of Pittsburg. One train of rolls will be erected and will be capable of rolling plates from 115 to 120 inches wide and 1½ inches thick. The rolling department will occupy a building 250 feet long by 90 feet wide. The three shears for the shearing department are making by the Morgan Engineering Company, of Alliance. They will have a cutting blade 126 inches long, and will have the necessary power to cut plates up to 1½ inches in thickness.

M. K. Moorhead & Co., of the Soho Iron-Works, are building a 15-ton open-hearth steel furnace. The foundations are in course of construction, and the firm expects to have the furnace ready to make steel within six months.

The old Edith furnace in Manchester, and the old Superior rolling-mill adjoining it, have been purchased by the National Tube-Works Company of McKeesport, Pa. The furnace will be put in blast as soon as possible, and the rail mill will be used to make muck iron.

Mr. James P. Witherow, of Pittsburg, Pa., has closed with the De Bardeleben Coal and Iron Company, of Birmingham, Ala., for a furnace plant similar to that of the Dayton Coal and Iron Company, of Dayton, Tenn., with the exception that the furnaces will be 17 feet bosh instead of 20 feet. The works are to be located at or near Jonesboro', where it is proposed to found a new town to rival Birmingham, the name of which has not yet been determined upon. It is stated that Mr. De Bardeleben has been the pioneer of the whole iron development of Birmingham.

The new Hamilton furnace of Means, Kyle & Co., Hanging Rock, Ohio, which was blown in last week, is already working up to an average of 60 tons a day on native block ores.

The Belleville Steel and Iron Nail-Works of Belleville, Ill., has increased its capital stock from $45,000 to $70,000.

The spiegel furnace of the Passaic Zinc Company has now been running for nearly nineteen months. The company expects to blow out about the middle of this month to reline and make general repairs, and will then blow in the furnace as soon as possible.

The Hartman Steel Company, Beaver Falls, Pa., has begun the erection of a brick building for the purpose of introducing machinery and manufacturing wire door-mats, steel signs, etc., under patents that it has lately purchased a controlling interest in.

The furnaces and plant of the Philadelphia Iron and Steel Company, No. 939 North Delaware avenue, Philadelphia, were sold at auction on the 7th inst., for $100,000. James V. Watson, the President of the Consolidation Bank, a large stockholder, was the purchaser. The works were built in 1845. The plant consisted of one single and three double puddling-furnaces, one rotary squeezer, seven heating-furnaces and five roll-trains—two 18-inch, one 12-inch and one 8-inch. The works have a capacity for producing 10,000 tons annually of bar, angle, and tee iron, fish-plates and special shapes.

The London Steel-Works, London, Ontario, were offered for sale at auction on the 5th inst., but, with the exception of a few small lots of material, the property was withdrawn. A private offer is said to be under consideration for the work.

The Tabor Matchless Concentrating Company, of Denver, Colo., will soon place one of its machines in the old Robert E. Lee sampling-mill, at Leadville, so that its merits can be fully and economically tested by the Leadville miners. The company has about a dozen machines in successful operation in the West.

The Holly Manufacturing Company, of Lockport, New York, will furnish the pumping machinery for the following water-works: At Tonawanda, New York, two Gaskill pumping-engines of 4,000,000 gallons combined capacity; at Streator, Ill., and at Denison, Texas, each two Gaskill pumping-engines having a combined capacity of 3,000,000 gallons daily. Bay City, Mich., a high-duty pumping-engine of 4,000,000 gallons capacity; the extraordinary duty of 100,000,000 foot-pounds is guaranteed by the builders. For Bluffton, Ind., a Gaskill pumping-engine of 1,000,000 gallons daily capacity. For the additional water-power pumping machinery needed by the city of Big Rapids, Mich., two pumps, which will deliver 3,000,000 gallons daily.

PROPOSALS.

The Supervising Architect, Treasury Department, Washington, D. C., will receive proposals until April 26th for furnishing and fixing in place the corrugated iron arching and iron furring and lathing in the court-house, post-office, etc., building at Pensacola, Fla.

The commissioners of Fairmount Park, City Hall, Philadelphia, Pa., will receive proposals until April 16th for one No. 3 Deane steam-pump complete, with all fittings, boiler, etc., delivered and guaranteed.

LABOR AND WAGES.

The strike among the rubbish hands in the slate quarries at Penargyl, Pa., has ended, the men having accepted an increase of 10 per cent. Their demand was for an increase of 25 per cent.

The strike among limestone quarrymen near Carbon, Ohio, has been compromised. The demand was for an increase in wages from 12 cents to 15 cents a ton. The compromise price was fixed at 14 cents a ton.

The men employed by the East St. Louis Rolling-Mill, and the Tudor Iron-Works, in St. Louis, Mo., refused to work on the 8th inst., because the mills used coal from cars handled by non-union switchmen. As a consequence, the mills are idle.

It is reported at Huntingdon, Pa., that the Clearfield miners desire Governor Pattison to act as arbitrator in their difficulties with the operators. The strikers are beginning to suffer for want of the necessaries of life, and most of them are anxious to end the strike.

A committee representing the coal miners in the Four Pools on the Monongahela River, Pa., on the 8th inst., called upon the operators at Pittsburg and demanded an advance on May 1st from 2½ to 2¾ cents a bushel. Should the advance be refused, a general strike is threatened.

The entire force at the Edgar Thomson Steel-Works, Bradford, Pa., went to work on the three-turn system this week. Three turns of eight hours each will now be the rule in the rolling, blooming, and converting mills.

The strike of the puddlers employed in the Valley Iron-Works of C. E. Pennock & Co., Coatesville, Pa., which took place five weeks since for an advance of 10 per cent, came to a settlement by the firm agreeing to pay the price demanded. The men resumed work on the 5th inst.

TRANSPORTATION NOTES.

The Northern Pacific Railroad Company has made arrangements for increased steamer service to Sitka, Alaska, in connection with its line, in view of the increased travel to Alaska, occasioned by the recent reports of the rich mineral strikes made there. The Pacific Coast Steamship Company will double its service on the route from Port Townsend to Sitka and return, at least during the summer season, probably up to and including October. The first boat will leave Port Townsend May 17th, and every two weeks thereafter regularly. The rates from St. Paul to Sitka and return will be $195; St. Paul to Sitka, first-class, $95; emigrant, $73.25.

The work of grading the new line of railroad running from Houtzdale to Coalport, Clearfield County, for the Pennsylvania Railroad Company, has begun. The new road is to be nine miles long and will be completed in four months. It will form a connecting link between the Northern Central and the Pennsylvania Central, connecting with the Cresson and Bell's Gap railroads, and will prove the most important outlet for the Clearfield coal trade.

The Lehigh Valley Railroad Company is surveying a coal and freight route between Pittston and Fairview, Pa., to follow close to the Lehigh & Susquehanna tracks, and between the two points the distance will be eight or ten miles shorter than the present road, which passes through Wilkes-Barre and Sugar Notch. The road will also be a connecting link for the Erie & Wyoming and the Pennsylvania Coal Company. As soon as the survey has been completed, work will begin by a large force of men.

The trustees of the Cheyenne & Northern Railroad have obtained the former Union Pacific surveys for the railroad from Cheyenne, Wyoming, north, a saving of about $50,000. Work will begin at once. The road will open up the vast agricultural and mineral resources of the Upper Platte Valley and the intervening country.

The contract for building the Midland Railroad from Leadville to Aspen, Colorado, has been awarded to Orman & Crook, of Pueblo. The contract includes the construction of a tunnel 2200 feet long through the Sugar Loaf Mountain. Work will begin immediately.

COAL TRADE NOTES.

BELGIUM.

Cable advices state that the government has forbidden the use of dynamite in collieries and mines by workmen. Henceforth only overseers will be intrusted with the explosive.

ILLINOIS.

The Kinmundy Coal Mining and Manufacturing Company has increased its capital stock from $15,000 to $18,000.

OHIO.

The Morris Coal Company has sunk three new shafts near Vienna. Enough coal has been taken from each to assure a good supply of excellent coal. The New York, Pennsylvania & Ohio has built new tracks to reach the new shafts.

PENNSYLVANIA.

ANTHRACITE.

On the 3d inst., the Big Mine Run colliery at Ashland suspended indefinitely, owing to dullness in the coal trade. At the Reliance colliery, at the same place, the pumps have broken, and the water has risen rapidly. Some time will elapse before the mine can be put in working condition again. The Otto colliery, in the west end of Schuylkill County, is undergoing extensive repairs, and will soon resume operations.

The work of driving the tunnel in order to reach the bodies of the buried miners in No. 1 slope of the Susquehanna Coal Company at Nanticoke progresses slowly. In two weeks, only fifty feet have been penetrated. Three more weeks of continuous work will be required to reach the workings where the dead bodies are supposed to be.

A hearing was held at Philadelphia on the 8th inst., in the suit brought by the Lehigh & Wilkes-Barre Coal Company against the Philadelphia & Reading Coal and Iron Company, in which the latter is charged with not living up to the tripartite agreement by which any deficit was to be made up in the coal production. The Lehigh & Wilkes-Barre Coal Company claims that such a deficit exists, and that it amounts to 784,000 tons of coal.

BITUMINOUS.

The Clearfield Creek Coal Company, of Clearfield County, has been started with a capital of $250,000—2500 shares.

The rise in the price of coal caused by the strike of the miners has had the effect of opening up mines that have been disused. The Everett Iron Company has taken a large contract to furnish coal for the Clearfield Coal Company. It is to be taken from the mines at Kearney, Bedford County, which have never been worked by the Everett Company except to supply its own furnaces. They have not been operated for more than a year.

COKE.

According to the Connellsville *Courier*, about 10,000 ovens were in operation during the week ended the 2d inst., the 5 per cent shut-down order not having been observed. Of the 10,832 ovens in the region, there were but 956 idle this week, classified as follows: Pool ovens, 278; furnace ovens, 40; independent ovens, 511; old ovens, 127. There is an abundance of labor reported, although there are few idle men.

J. W. Moore & Co. have begun sinking a shaft at their Mammoth coké-works near Uniontown, in order that the mine may be worked from both sides. A drift has already been made, and the shaft will reach the coal at the foot of the drift. Meanwhile, preparations are making to build 200 more ovens at the mouth of the shaft, making the total plant 500 ovens.

The addition that the United Coal and Coke Company intends making to its works will consist of 110 ovens, and will make its total plant 210 ovens.

TENNESSEE.

The Bon Air Coal, Land, and Lumber Company expects to build a railroad to its coal lands this year and open mines with a capacity of from 30 to 50 cars of coal a day. It is now seven miles from the terminus of the McMinnville Branch Railroad. The directors expect to have the road under contract within sixty days.

GAS AND OIL NOTES.

Exports of refined, crude, and naphtha from the following ports, from January 1st to April 3d:

	1886. Gallons.	1885. Gallons.
From Boston	1,195,879	1,554,489
Philadelphia	29,363,788	20,441,470
Baltimore	2,914,987	2,634,814
Perth Amboy	718,086	
New York	95,214,808	88,917,684
Total exports	129,407,548	113,548,457

A dispatch from Vienna states that a compromise is imminent tending to a renewal of the Austria-Hungarian treaty. It has been settled that a small duty shall be placed on American raw and half-refined petroleum, and that a heavy duty shall be placed on Russian and Roumanian petroleum.

CALIFORNIA.

According to the Los Angeles *Herald*, steps have been taken to develop more actively the supply of petroleum that lies in a subterranean basin across the whole country from west to east. A portion of La Brea rancho has been leased for the purpose of boring for oil, and the lumber and machinery are already on the ground for that object. Operations will begin at once. The lessees can bore on 500 acres of La Brea. They have also leased a portion of the ranch of S. P. Rogers, adjoining La Brea. Messrs. Hammel and Denker, who own the Rodeo de las Agusa, west of La Brea, will also sink wells near their petroleum springs. In Petrolia, Humboldt County, active work is going forward in sinking wells. Two wells here are producing oil. The Puente wells are turning out oil abundantly.

PENNSYLVANIA.

Natural gas has been introduced in the nail department of Chess, Cook & Co.'s factory at Pittsburg. It will be introduced in every department of the mill.

The Sharon Iron Company, P. L. Kimberly & Co., and other Sharon mill owners have signed contracts for fuel gas with the Columbia Natural Gas Company, of Franklin, Pa. That company will lay two 8-inch mains from the Speechly District, supplying Middlesex, Mercer, Sharon, and Wheatland. One line will be extended to Youngstown, Ohio.

The Sewickley Gas Company has reduced the price of illuminating gas to $1.70 per 1000 feet, with 20 cents a thousand off for prompt payment.

The Wheeling Natural Gas Company has let contracts for pipe and pipe-laying, and work will begin on the 20th inst. on the first line of pipe, which will run from Hickoryville, Washington County, Pa. In the mean time, the work of making contracts with consumers in West Virginia will go on. Until the company gets in good working shape, nothing will be done in regard to drilling on the immense tract of territory owned by the company in West Virginia and Pennsylvania.

The Douglass Station Oil and Gas Company will begin a test well on its territory near Douglass station as soon as the rig is up.

PRUSSIA.

PROVINCE OF HANOVER.

Since October last, trial borings for petroleum have been going on at the Jenisen Gute Modesse iron grounds, near Peine. *Kühlow's German Trade Review* states that, besides the iron-stone, which according to analysis contains 19·46 per cent of iron ore, a valuable bed of earth has been struck, which is over 20 meters thick and contains about 78 per cent lime. In February, however, at a depth of 53 meters, traces of oil were found of such a decided character that it is believed that oil springs may be expected. According to this find, the views of geologists, who have for years maintained that the oil vein in this district coming from Brunswick takes a westerly direction toward Oelheim, are confirmed.

RUSSIA.

Fifteen large firms have withdrawn from the congress summoned by the Russian government to assemble at Baku on March 27th, to devise means for the development of the Apsheron Peninsula petroleum fields and to regulate the Russian oil trade. The reason given for this action is the rejection by the majority of the retail dealers in the congress of the proposition to give the manufacturers a vote for every 300 poods (about thirty-six barrels) of raw, or every 100 poods (about twelve barrels) of naphtha products made by them. The retiring dealers have joined in a petition asking the government to make the disputed regulation compulsory.

WEST VIRGINIA.

The Pennsylvania Coal and Coke Company, of Wilkes-Barre, Pa., has begun boring for oil on its 622 acres of land at Oakvale.

The West Virginia Gas, Oil, and Gas Coal Company has been incorporated at Mannington, with a capital stock of $1,000,000.

GENERAL MINING NEWS.

ARKANSAS.

MONTGOMERY COUNTY.

CENTRAL CONTINENTAL GOLD AND SILVER MINING COMPANY.—This company has a force of twelve men at work, and is making arrangements to put up machinery, etc. A stockholders' meeting was held at East St. Louis, Ill., March 29th, to consider the purchase of the claims near Idaho Springs, Colo. This, in addition to its Arkansas property, puts the company on a better footing than before. Stephen E. Barron is general manager.

CALIFORNIA.

MONO COUNTY—BODIE DISTRICT.

The Standard and Bodie mining companies are making arrangements to pump the water out of the lower levels of their mines.

NEVADA COUNTY.

CHAMPION VS. WYOMING.—In the Superior Court at Nevada City, in the suit of the Champion Mining Company to recover $300,000 damages from the Wyoming Mining Company and to restrain the defendant from further working in a ledge claimed by plaintiff, judgment has been given in favor of plaintiff for $102 and costs up to the time of filing the answer in the case.

CANADA.

PROVINCE OF NOVA SCOTIA.

BAARS & MCNAUGHTON.—This mine is owned by six persons with the following interest: J. F. Baars, Jr., $\frac{1}{32}$, Grand Rapids, Mich.; R. McNaughton, $\frac{5}{32}$, Rawdon, Nova Scotia; W. O. Hughart, Jr., $\frac{5}{32}$, Duluth, Minn.; J. B. Howard, $\frac{5}{32}$, Duluth, Minn.; McGuire & Leavitt, $\frac{5}{32}$, Minneapolis, Minn. The property is 1800 feet long by 1250 feet wide. The vein now worked shows gold ore 1800 feet in length. The 10-stamp mill started up on the 11th of February, crushing 95 tons, and cleaned up 304 ounces for the month. During March, 400 ounces were produced. The results so far obtained have been very satisfactory.

COLORADO.

CLEAR CREEK COUNTY.

PAY ROCK.—This mine is now netting from $1000 to $1500 a month, with prospects of doing better. A great deal of development was done last year, but the yield paid the running expenses of the mine.

PURITAN.—One half the Evening Star lode, on McClellan Mountain, has been purchased by this company for $8000. But little development-work has been done on the claim. A streak of ore that yields largely in both silver and gold is exposed in the discovery-shaft.

DOLORES COUNTY.

C. H. C.—Temporary arrangements have been completed between the Grand View Company and C. H. Carpenter, by which the mine will be worked jointly, and the ore shipped to the Grand View Smelter. There are 300 tons of ore at the mine awaiting shipment.

GRAND VIEW.—It was expected to have the works in operation by the 7th inst.

GILPIN COUNTY.

CALIFORNIA.—Since starting up on the 17th of March, the water has been got under control at the 1500-foot station, where the heaviest body in the mine was encountered, the ground being open the entire length of the mine, some $2000 feet. No detention arising, it is anticipated that by the first of May the 1600-foot station will have been reached, the levels cleared of débris, the necessary timbers put in, and ground broken and ore sent to the stamp mill and smelter.

GREGORY-BOBTAIL.—The diamond drill secured for prospecting and heading purposes in the incline shaft has been started up, and will be run south some forty feet across country-rock, to determine whether the incline is on the Gregory vein.

MCCALLISTER CONSOLIDATED.—In sinking the discovery-shaft of the McCallister lode at about the depth of 260 feet, the men broke through into an open drift. Upon examination, it is found that this drift is driven on the course of that lode about 140 feet, a small amount of stoping having been done in the back, which exposes a tolerably fair vein of ore.

LAKE COUNTY.

The Leadville *Herald-Democrat* reports the following:

The Leadville smelters are doing fairly well at present. There are twenty-one stacks in the active works of this city, of which fifteen are in blast. Nearly all the smelters carry large stocks of ore, and their contracts with mines warrant the belief that by the first of July from 18 to 19 of the available furnaces in Leadville will be in blast, and that ore-shipments from here to Pueblo and Denver will continue as large as in the past.

Mr. James Shinn, superintendent of the Silver Cord property, has secured six acres of ground, within the boundaries of the Moyer placer, a short distance southeast of the Moyer shaft, and is making preparations to sink a shaft to mineral. Mr. Shinn has secured the co-operation of a number of Denver capitalists, and $25,000 are at once to be advanced for the undertaking.

FOREPAUGH.—The water has all been taken from this mine, and the stopes and drifts are accessible again for the first time in a year. The Forepaugh is connected with the Little Sliver under ground, and the two mines will probably work in harmony in draining this section of East Fryer Hill. The bottom of the Forepaugh shaft is still in ore, and it will unquestionably be sunk to greater depth.

HARRIS SAMPLING MILL.—This mill, erected on the site of the former Tabor mill, is about to be utilized again. The property has been secured by Mr. J. J Crammer, who has experimented considerably with the dressing of Leadville ores. It is his intention to put up a mill for the treatment of ore adapted to concentration.

IRON SILVER.—The company recently settled for quite a large lot of ore from the McKeon workings, which returned, it is stated, over $300 a ton.

LEADVILLE TUNNELING, MINING, AND DRAINAGE COMPANY.—The mines that would probably be con-

nected with the tunnel that is to be driven from California Gulch below Leadville, to tap the mines of East Fryer and Carbonate hills at the depth of from 800 to 1000 feet, as mentioned in our last issue, are the Chrysolite, Little Pittsburg, Little Chief, Amie, Climax, Virginius, Dunkin, Matchless, Robert E. Lee Little Sliver, Forepaugh, Tip Top, Cora Belle, Lee Basin, Denver City, Hibernia, Small Hopes, New Pittsburg, Henriett, Morning Star, Evening Star, Big Chief, Maid of Erin, Adams, Wolfe Tone, and a dozen minor properties.

MODOC.—The lessees of this mine on Carbonate Hill are opening up the iron ore-body disclosed in the shaft some years ago.

ORINOCO.—Mr. J. C. Langhorne, of the Dinero mine, has purchased a three-eighths interest in this lode, adjoining his property, for $3000.

VENTURE.—This mine, on Sugar Loaf Mountain, is worked actively, but the water encountered retards operations, and makes the extraction of mineral expensive.

WOLFE TONE.—The Pueblo Smelting Company has contracted for 1500 tons of ore. The present product of the mine is about fifty tons a day. The property continues looking well and its resources remain unimpaired. The amount of water encountered is large, but not sufficient to interfere with the successful operation of the mine.

OURAY COUNTY.

MINERAL FARM.—This property, which was formerly owned by the Norfolk & Ouray Mining Company, and recently sold by the receiver of the defunct Exchange Bank of Norfolk, Va., was purchased by parties who reorganized under the name of the Mineral Farm Mining Company, with a capitalization of $250,000. The company, in addition to the Mineral Farm, owns other valuable property. The property is provided with hoister, cages, air-compressor, sawmills, pumps, concentrator and other needed and useful machinery. M. S. Corbett will be the Ouray manager. Work has been resumed.

PITKIN COUNTY.

CONNEMARA.—Messrs. J. Reynolds and J. D. Morrissey have become further interested in this mine, having just paid William Hoag $10,000 for his sixteenth interest.

SUMMIT COUNTY.

The prospects of the Breckenridge Mining District are reported as very encouraging. Less than two years ago, there was but one small quartz mill in the district which was not running one third of the time, while now there are 150 stamps employed almost continually, and, with the opening of the roads, it is thought even this number will not suffice to treat the product of the many promising gold mines in the neighborhood.

ROBINSON CONSOLIDATED.—The output has been temporarily reduced pending the completion of an unusual amount of development-work. The incline is advancing, and within a short time the station for the 1600-foot level will be cut out. The incline is still in ore, but the streak or vein has diminished until it is only two feet in width. The shipments at present average about twenty tons a day.

DAKOTA.

LAWRENCE COUNTY.

CALEDONIA.—The official report of the superintendent, dated March 29th, states that 988 tons of ore were produced from the 425-foot level, and 339 tons from the cave, or a total of 1327 tons. The winze advanced 5 feet, making a total depth of 76 feet. The south drift advanced 6½ feet, making a total of 90½ feet. The ore throughout the mine looks fair.

CALUMET GOLD AND SILVER MINING COMPANY.—This company has been incorporated at Deadwood. The property consists of the Hannibal and North Star lodes, in the Ruby Basin.

FATHER DE SMET.—During the week ended the 2d inst., there were extracted at the first, second, and third levels 3450 tons.

HARTSHORN SILVER MINING COMPANY.—The capital stock of this company, which has just been incorporated at Deadwood, is $1,250,000; par value, $5. Not to exceed 50,000 shares will be sold at not less than 10 cents a share, to form a working capital. The property of the company consists of the well-known Hartshorn and other lodes of the Carbonate Camp. Active operations will begin soon. The mine will be thoroughly prospected and sampled before purchasing expensive machinery.

UNCLE SAM.—A large body of rich ore, it is said, has been encountered in the mine. By the end of this month, it is thought that there will be enough ore in sight to start the mill on a continuous run. The stock sells at $2 a share.

PENNINGTON COUNTY.

BENGAL TIGER.—It is reported that the ore-vein has again been struck, this time at a depth of 190 feet below the surface.

ONTARIO SILVER AND GOLD MINING COMPANY.—This company, organized at Deadwood, will have 250,000 shares, of which 24,000 shares will be placed on the market at five cents a share, to be used as treasury fund for the forwarding of work on the claims of the company, which are named the Hancock, Calumet and Hecla. The work of developing is to be pushed at once.

STAR.—This company, which has been organized at Deadwood, owns four full claims on the Carbonate belt—the Savage, Mexican, Ophir, and Martin. The capital stock is $500,000, in 200,000 shares, par value $2.50 each. Sixty thousand shares have been retained as treasury stock, to be sold for developing purposes. The sale of 20,000 shares of the treasury stock has been authorized.

IDAHO.

BANNOCK.—The question of erecting a mill on the Horn-Silver mine, the company's property, to reduce its ores, is now discussed. Shafts sunk at various places have proved the ore to be pretty evenly distributed over a large surface, and to be of such quality as to make a mill most desirable.

CŒUR D'ALENE WATER AND MINING COMPANY.—The capital stock has been increased from $250,000 to $500,000.

CRŒSUS.—This mine, near Hailey, has been sold for $10,000.

HELENA CONCENTRATING COMPANY.—This company has been organized at Helena, Montana, under the laws of that territory, with a capital stock of $100,000. The officers elected for the first three months are: S. T. Hauser, President; A. M. Esler, Vice-President and General Manager; A. M. Holter, Treasurer; W. E. Cox, Secretary. The object of the company is the mining, concentrating, milling, and smelting of gold and silver ores in Shoshone County. The erection of works will begin at once at Kentucky, a small town about twenty-eight miles from Murray, the center of the Cœur d'Alene mining region, and ten miles from the head of navigation on Cœur d'Alene River. It is thought that the works will be in operation by the first of June. They will have a daily capacity of fifty tons.

MEADOW LAKE.—This property, owned by the Kansas City Smelting Company, is yielding remarkably well for the amount of work done. A body of ore of better grade than any heretofore extracted has been struck, and regular shipments are made to the smelter at Nicholia.

MINNIE MOORE.—The work is pushed easterly in the 600 level, and the ledge recently struck increases in richness. The management will sink the shaft 100 feet deeper. The jigs are to start up and shipments of ore be resumed.

INDIANA.

VANDERBURG COUNTY.

EVANSVILLE LEAD AND SPAR.—This company has succeeded to the business of B. Burbanks & Co., at Evansville, miners of fluor-spar.

MAINE.

HANCOCK COUNTY.

ROSIER.—Work has been resumed at this mine at Brooksville. The mine is draining from water; and as soon as this has been done, the sinking of the different shafts will begin. No. 1 shaft is down 401 feet, and No. 2 113 feet.

MEXICO.

ANGLO-MEXICAN MINING AND LAND COMPANY.—The company has started up the new 30-ton furnace at its mines in Sinaloa. It works to perfection with wood and charcoal, thus saving the heavy expense of coke. There is said to be an immense quantity of ore on hand ready for smelting.

ESPIRITU SANTO.—A company has just been formed for working, on an extensive scale, this mine at the Cerro Yauco, Sinaloa.

SAN IGNATIO.—A good strike is reported at this mine, near Hermosillo, State of Sonora. It has for forty years paid fairly well.

ST. LOUIS & ZACATECAS ORE COMPANY.—The company is buying ores at Zacatecas at fair prices, shipping the ore up the Mexican Central Railroad to smelting-works at various points in the United States. The ore on the dumps of the ancient mines is sorted over for ore that modern processes make it valuable to work.

RUBY HILL TUNNEL AND MINING COMPANY.—At the annual meeting, there was submitted a report for the year ended March 22d, 1886, from which we take the following: Cash assets for the year, $4381.55; by cash paid B. F. McEwen, Treasurer, $4381.55; amount due the company on assessments Nos. 8 and 10, $8.20. Expenditures for the year, $3669.20. During the year, the main tunnel was extended 250 feet; total length of tunnel, 1100 feet. The north drift, 1000 feet from the mouth of the tunnel, was begun and extended 10 feet, and an incline was sunk in it 18 feet. A general statement of the corporation from its organization to date shows the total receipts to have been $13,749.82; total disbursements, $13,037.54. The plot of mineral ground owned by the company embraces twenty claims, several of which are patented, and all of which have a combined surface area of probably 2000 feet wide by 3000 feet in length.

MICHIGAN.

COPPER MINES.

OSCEOLA.—The twenty-five 2000 candle-power Western Electric arc lamps put in the Osceola mill were lighted March 30th for the first time.

QUINCY.—The company has contracted to have a system of electric lights established both at the mine and at the mill.

TAMARACK.—The company has decided to build a stamp-mill this season, to put in two heads of Ball's stamps, and to complete the trial of the Sturtevant system. The company is pleased with the latter as far as its experiments have gone. The March output of the Tamarack was 220 tons, against 200 in February, and 130 in January; total of the three months, 550 tons "mineral." Work upon the sixth level at the Tamarack mine is progressing rapidly, and the rock makes the best showing of any thus far. When active operations begin in the sixth level, which will be some time this month, two heads of stamps will run continuously, instead of 1½ stamps, as at present. The output from this time is expected to be fully three hundred tons a month.

IRON MINES.

TRADERS'.—The work done is only exploratory, but so far, shows excellent results. The shaft is down 30 feet, about 20 feet of which are in ore. At the bottom, a drift has been driven to the south across the vein 40 feet, all in clean ore.

WEBSTER.—This mine, near Michigamme, will be worked again this year, after lying idle for a length of time.

MONTANA.

BEAVER HEAD COUNTY.

HECLA CONSOLIDATED.—The official report shows the production for March to have been 130·329 ounces of gold, 44,817·95 ounces of silver, and 541,210 pounds of lead.

LEWIS & CLARKE COUNTY.

BOSTON & MONTANA.—The statement for March shows a total bullion production during the month of $66,500. Pay-rolls for the month, $18,600; supplies bought, $10,150; quicksilver bought, $11,750; boarding-houses, $1600; new pump fittings, $800; retorts, $900; total expenses, $35,900; net profit, $30,600.

MEAGHER COUNTY.

NEIHART TUNNEL AND MINING COMPANY.—This company has been organized to develop quartz ground at Neihart, by means of tunnels. It is capitalized at $300,000. The officers are: President, Moses Morris; Vice-President, Thomas Cruse; Treasurer, James H. Moe; Secretary, E. J. Carter. The company has driven a tunnel 130 feet, cutting through a valuable lead, and let a contract to continue the tunnel, the objective point being a group of half a dozen leads owned by the company, among them an extension of the Montana Belle.

SILVER BOW COUNTY.

ALICE.—Sinking the main shaft to the 1000-foot level has begun.

LEXINGTON.—Official reports for March show that there were produced gold valued at $6524, and silver at $84,525—a total of $91,049.

MONTANA COPPER COMPANY.—Reports are, that the pumps were to be removed on April 1st from the 400 and 800-foot levels. The expense of working these pumps has been too great for the returns made. The proprietors of the claims adjoining the East Colusa,

who, it is alleged, derived a certain profit from the working of the pumps, declined to stand a part of the expense. This virtually means a shut-down of the East Colusa. Operations at the West Colusa will continue.

NEVADA.

PACIFIC BORAX, SALT, AND SODA COMPANY.—This company has been organized under the laws of California, for the purpose of acquiring borax and saline lands in Nevada. The directors are: A. H. Clough, J. W. Mather, F. B. Pritchard, J. H. Maynard, and F. M. Smith. The capital stock is $500,000.

ELKO COUNTY.

NORTH BELLE ISLE.—The case of the North Belle Isle Mining Company *vs.* E. M. Lafferty and others, enjoining the working of certain mines at Tuscarora, came up in the United States Circuit Court at Carson, to which it had been transferred from the District Court at Elko. On motion to dissolve the injunction, after considerable argument of the attorneys, and the filing of sixteen affidavits, Judge Sabine declined to pass upon the motion at the time, but continued the whole matter until May 3d next, and in the mean time issued a new injunction in addition to that issued by Judge Edwards, including other and new defendants, enjoining all adverse claimants, some forty in all, from mining upon the grounds in dispute. It turns out that the suit involves different titles and between different parties from those in the suit in the case tried before Judge Bigelow, at Elko.

ESMERALDA COUNTY.

MOUNT DIABLO.—Important improvements are reported to have taken place. The development is between the fourth and fifth levels. A change for the better is also reported on the eighth level.

STATE LINE.—The first shipment from this mine is a bar of bullion valued at $4000.

LANDER COUNTY.

CHICAGO MINING AND REDUCTION COMPANY.—It is stated that this company has purchased the Twin River mine, near Austin.

STOREY COUNTY—COMSTOCK LODE.

From the Virginia City *Chronicle* we take the following:

CONSOLIDATED CALIFORNIA & VIRGINIA.—During the week ended the 27th of March, 1044 tons of ore were shipped to the Morgan mill, and 1762 tons to the Eureka mill. The average value of ore milled during the week, according to assays from battery samples, was $16.87 a ton for that crushed at the Morgan mill, and $18.66 for that crushed at the Eureka mill. During the same period, bullion valued at $40,578.37 was shipped to San Francisco.

GOULD & CURRY.—A west cross-cut has been started from the southwest lateral drift on the 600 level, 317 feet from the main west drift from the station in the Bonner shaft. This cross-cut is penetrating a vein of mineralized quartz. The southwest drift will eventually be opened up to the Savage line, as originally intended.

HALE & NORCROSS.—The uprise from cross-cut No. 3 on the 3100 level is advancing along the vein, showing a breast of ore the width of two sets of timbers. The ore varies widely in grade. Connection was to be made with the 2900 level on the 29th ult., by the uprise from the 3000 level over the top of the deep winze.

KENTUCK.—The trustees offer to lease the mine for the consideration of a certain royalty on ore extracted.

SIERRA NEVADA.—A few tons of ore extracted from the old Texas tunnel, near the summit of Cedar Hill, have been shipped to Fisher's mill in Six-Mile Cañon. This ore is taken from a vein uncovered in the south drift from the tunnel line.

NEW MEXICO.

GRANT COUNTY.

GOLDEN RULE.—The sale of this mine to H. H. Carpenter, of Silver City, for $30,000, is reported. Preparations are making for putting the mill in operation.

PEERLESS.—The mine is steadily improving and producing more uniformly rich ore than the first two car-loads. Every foot of the workings is in good ore. The vein has been opened up 470 feet north of the main open cut, thus proving the ore-chute to extend at least 540 feet.

SOCORRO COUNTY.

GRAPHIC MINING AND SMELTING COMPANY.—This company has been reorganized, it is stated, on a new and more substantial basis, with sufficient means to increase the capacity of the works at Socorro and to conduct the business on a much larger scale. A new furnace has been ordered, which will add to the capacity of the works sixty or seventy tons a day.

NORTH CAROLINA.

BURKE COUNTY.

CAROLINA QUEEN.—This placer mine, which is owned by Boston capitalists, will resume operations.

MECKLENBURG COUNTY.

RUDISILL MINING AND MILLING COMPANY.—The Rudisill mine has been bought by a party of Harrisburg, Pa., capitalists as follows: J. I. Beggo, J. Wallower, Jr., T. H. Heist, and William T. Hildrupt. They paid $40,000 for the property, payments to be made in installments. The company was organized with a capital of $200,000, and will go immediately to work. New ground is to be opened, and additional machinery will be placed. A working capital of $10,000 bas been paid in to start with. The ore is a heavy sulphuret, and of late years has been shipped for reduction.

SWAIN COUNTY.

NORTH CAROLINA TALC AND MINING COMPANY.—The company will open mines near Jarrett at once, and erect mills for grinding the talc.

UTAH.

SALT LAKE COUNTY.

The shipments of bullion from Salt Lake City, including ore, during March, aggregated $469,772.63; total in 1886, $1,254,649.32.

GERMANIA.—The company's smelters at Salt Lake City have closed down for the regular spring clean-up. A new engine is going in.

SUMMIT COUNTY.

A 40-light plant of the United States system has been received at the Marsac mill, Park City, and light will be furnished to the Ontario and Marsac mills, and, if successful, will be furnished to the merchants and others desirous of having it.

WASHINGTON COUNTY.

CHRISTY.—The cross-cut, run from the bottom of the winze below the 250-foot level in the Storm King, has tapped the upper vein so that stoping can now be operated on both veins. The winze from the 600 in the California is about sixty feet deep. Pockets of good ore were found in the ledge that have developed into a permanent streak running through the bottom of the winze. The ore assays a little over 200 ounces of silver, and is in the deepest workings on the Buckeye Reef.

STORMONT.—A cross-cut has been started on the fifth level south in the Buckeye and Savage toward the hanging, after reaching which, winze No. 30 will be sunk to the 600-foot level. The ledge, at this point, is thirty feet in width, and as the country above it has produced a large quantity of ore, some good stoping ground will probably be opened up.

MARKETS.

Silver.

NEW YORK, Friday Evening, April 9.

DATE.	London. Pence.	N. Y. Cents.	DATE.	London. Pence.	N. Y. Cents.
April 3.	46⅝	101⅞	April 7	46⅝	101⅞
5.	46⅝	101⅞	8	46⅝	101⅞
6.	46⅝	101⅞	9	46 9-16	101¾

London has not yet, at least, shown any change for the better for silver, as resulting from the action of the House of Representatives yesterday.

Foreign Bank Statements.—The governors of the Bank of England, at their regular weekly meeting, made no change in the bank's minimum rate of discount, and it remains at 2 per cent. During the week, the bank lost £529,558 bullion; but the proportion of its reserve to its liabilities was increased from 39¾ to 40 1/16 per cent, against 47 per cent at this date last year. On the 8th inst., the bank lost £89,000 on balance. The weekly statement of the Bank of France shows a gain of 6,865,000 francs gold, and a gain of 4,515,000 francs silver.

The general tone of the market is certainly not as cheerful as it was a few weeks ago; in fact, as our weekly reports have shown, the market has been becoming more and more quiet for two months past, steel rails offering the only important exception. The strikes on the railroads and at the coal mines are the most important cause of this feeling of uncertainty and depression in the market, and the effect will probably be to prevent advances in wages in many industries where they were looked for, and generally to retard the prosperity to which every one was looking forward.

Copper.—This market is extremely quiet, though prices are nominally unchanged. Producers are extremely firm, and show not the least anxiety about selling, a better market being confidently anticipated. There are no stocks here, and even at the Lake stocks are very much lighter than is usual at this season of the year, more copper having come forward by rail than is usual. The statistical position here is, therefore, very satisfactory, and the supposition that some English dealers appear to credit, that copper is being stocked here, because it is not going abroad, is quite unfounded. Our copper is going into consumption at home, and if the European market wants it, a higher price must be paid. The Lake stock, which at this season of the year is generally 4½ months' production, is now probably less than three months' output, or say from 15,000,000 to 18,000,000 pounds, a large part of which is sold to manufacturers.

We quote Lake 11½, and Orford and Baltimore, 10 to 10½c., according to quality. There are rumors of lower prices on Lake, but no one can be found who would or could supply the metal at the prices mentioned, and they are probably rumors circulated in the hope of getting copper to fill some of the numerous European orders now in this market unfilled.

London Cables to-day quote Chili Bars £41 5s. and Best Selected £46 10s.

During the week, there have been imported 230,450 pounds of ingot copper, and exported 280,000 pounds of ingot, 314,200 pounds of matte and 758,000 pounds of copper ore. On another page, will be found the statement of our exports and imports for the months of February and March, from or to this port.

Tin.—This market is very dull, though prices are nearly as high as quoted a week ago; 20·65@20·70c. are fair quotations for spot and April. London cables to the Metal Exchange to-day quote spot Straits £92 15s.; three months, £93 7s. 6d.

During the week (April 1st to 7th), the imports at New York were 392,220 pounds of tin, and 62,430 boxes of tin plate.

Lead.—Transactions in lead during the week have been confined to 150 tons Selected Foreign at 4·93c. ex store, and 100 tons Domestic at 4·90c. We quote the market very quiet at 4·90c. On another page, will be found the report of imports of lead at this port in February and March. Since April 1st, the imports of lead here have amounted to 1,230,606 pounds, some of which has been warehoused. Soft Spanish is quoted to-day in London at £13 10s., and English lead, £13 17s. 6d.

Lead pipe we quote here at 5·40@5·50c. net, and Sheet-Lead 6·20@6·25c. net. Drop Shot, 5¾c. Buck and Chilled, 6¾c. a pound, in 25-pound bags. Shot in 5-pound bags, about ¼ cent a pound more.

Messrs. Everett & Post, of Chicago, telegraph to us as follows to-day:

The market is very flat and weak, owing to reported free sales by St. Louis parties from 4·60@4·70c. basi there now. Buyers, expecting a decline, are holding off and buy only for immediate wants. This market closes quiet at 4·70c. bid.

Messrs. John Wahl & Co., of St. Louis, telegraph to us as follows to-day:

Under heavy offerings of both common and refined, this market has shown a slight decline. Sales will sum up probably 700 tons at prices ranging from 4·65@4·70c., principally for May and June delivery.

Spelter.—This market is unchanged. We quote 4·50@4·60c. for Missouri Domestic, according to quality, and 6¼@6½c. for New Jersey. New Jersey Zinc Oxide is quoted 3½@4c. Silesian Spelter is quoted in London to-day £14 10s. and here at 5c.

Sheet-Zinc is worth 5½@5·60c.

Antimony.—This market is quiet at 8¾c. for Hallett's, 9¼c. for Cookson's here, and in London £34 10s. for Hallett's; 54 casks were imported at New York this week.

Nickel.—We quote 70c. nominal; 5000 pounds were imported during the week.

IRON MARKET REVIEW.

NEW YORK, Friday Evening, April 9.

American Pig.—The iron market is very quiet and slightly depressed, though prices remain unchanged here. We continue to quote $18@$18.50 for No. 1 X; $17@$17.50 for No. 2 X; and $16@$17 for Forge, standard Lehigh brands, tide-water delivery. For special irons, 50c. and $1 more is asked. The production of iron is increasing, being now about 15,000 tons a week greater than it was a month ago. The weekly capacity of furnaces in blast is about 100,000 tons of all kind of iron.

Scotch Pig.—If the market was dull a week ago, it is now much worse. Imports of pig-iron at this port during the week are reported at 1625 tons, and even a small part of this is sufficient to depress the market below cost. We hear of Scotch iron now here offering at less than cost of importation. We quote as follows: Coltness, $20; Summerlee, $20; Gartsherrie, $19.50; Dalmellington, $19; Eglinton, $17.50. Cables to the Metal Exchange to-day quote Coltness, 47s. 9d.; Summerlee, 47s.; Langloan, 44s. 9d.; Gartsherrie, 43s. 6d.; Glengarnock, 43s.; Dalmellington, 41s.; Eglinton, 39s. 9d. Freights are quoted 5s.

Bessemer Pig.—The market is quiet. We quote Domestic at $18@$18.25 at the furnace, and Foreign ex ship about 50 cents more.

Spiegeleisen.—This market is weaker. We quote English, $26.50@$27; German, $26. Eighty per cent ferro-manganese is quoted at $67.

Structural Iron and Steel.—Prices remain unchanged. We quote Angles, 2@2·10c. delivered; Tees, 2·35c.; Iron Beams and Channels, 3c. for American from dock.

Plate Iron.—Common Tank, 2@2·15c.; Refined, 2¼c.; Flange iron, 3·4@3·5c.; Extra Flange, 4@4·25c.

Bar Iron.—Refined we quote at 1·80@1·95c.; Common, 1·55@1·70c. Store prices are ·10@·20c. higher.

Steel Plates.—We quote 2½c. for Tank; 3@3¼c. for Boiler and Ship Plates; 3¾@4c. for Flanges; 4¼@5¼c. for Extra Flange and Fire-Box Plate.

Merchant Steel.—American Tool Steel, 8@10c.; special qualities, 12@18c.; Crucible Machinery, 4½@5½c.; Bessemer and Open-Hearth Machinery, 2½@2¾c.

Old Rails.—Old Rails are dull. We quote Double-Heads at $20, and Tees $19, and it is doubtful whether these prices could be secured for large lots.

Steel Rails.—We hear of sales of only a few thousand tons at $34@$35, Eastern mills, at which prices we continue to quote. The mills are all full of work, and some of them refuse to take orders.

Scrap.—Quotations are unchanged at about $20@$21 for choice lots.

Philadelphia. April 8.

[From our Special Correspondent.]

The ore mining companies of New Jersey and Eastern Pennsylvania are operating all their properties with an increased force, and in some cases are stocking up ore.

Pig-Iron.—The week's business in pig-iron has been unsatisfactory. Most of the business that has been done has been in foundry iron. Mill-owners are not buying. Some of the interior mills have been trying the pulse of the market, but find makers of good iron as firm in their views as they have been at any time for a month or six weeks There is more or less talk about a drop in iron. The reason for it does not appear, unless it is to be found in a few sales at less than market rates. No good iron has been shaded. In fact, not a single company here has been offering iron at any thing less than prices that have been asked for weeks past. If there is any weakness in the market, it is in the poorer makes, and no one has been attempting to get top prices for these brands for some time. All the special brands are very firm, and are not offered. Some quiet business has been done this week in these brands, by way of renewal of contracts that are expiring this month. The renewals are made at about the same terms as the old contracts. If there is any upward tendency, it is not on the surface. Makers would be glad enough to realize better prices, but do not see their way clear to do so. Foundry irons run from $19@$20 for No. 1, and for No. 2 $16.50@$17.50 are the ruling figures. Forge iron might advance, if the ordinary demand was coming along, but it is not. Mill-owners have more reasons than one for not buying heavily. Prices range from $15.50@$17. Very few large lots are even asked for. Every one seems to be contented to buy in small lots, and let the prices of next month and the month after take care of themselves. The consumption of mills has slightly fallen off, but not sufficiently to affect the market from that cause.

Foreign Material.—Bessemer is quoted, as usual, at $19@$20, without any business; Spiegeleisen, $26@$27, with no known transactions.

Muck-Bars.—A little business is done all the time in Muck-Bars at $29@$30. Some large contracts could be placed if makers of muck-bars would take buyers' prices.

Merchant Iron.—Common iron has sold this week at $1.60. The mills in the interior of the State seem to be doing about all the business in this grade of iron. The stores have been doing very well here this week, but have been receiving iron in stock ordered some three weeks ago. Refined Iron is worth from $1.75@$1.90; Medium averages $1.65. Business is altogether of a retail character.

Nails.—Nails are nominally $2.40@$2.50. The demand from building sources is quite large, and with the help that is coming from the West, makers find no difficulty in selling all the nails they care to contract for. Two or three cases have occurred where late delivery contracts were placed about 10 cents below current rates.

Plate Iron.—The leading plate iron makers report business a little dull, but they are selling a little iron at 1·90@2c. for Plate; 2@2·10c. for Tank; and Skelp iron, 1·85c.

Sheet-Iron.—Considerable business has been done in sheet-iron, and all the mills are making full-time. The card rates are unchanged.

Bridge Iron.—A few small orders for bridge iron have been placed without any material change in quotations. There are negotiations in hand for large lots, but buyers are insisting on a shading of prices, which manufacturers in the present unsettled condition of the market are not willing to extend. Angles are 1·90c.; Tees, 2·30c.; Beams and Channels, 3c. Some agents are negotiating with Western parties for large supplies of summer and fall engineering requirements. There is no doubt but that a good deal of bridge building will be done later in the season.

Steel Rails.—Steel rails are quoted firm at $35@$36. More business could be done if $34 was taken, but rail-makers decline to yield in the least.

Old Rails.—A few small lots of old rails have been sold at $20@21. Supplies are increasing, and buyers are correspondingly backward.

Scrap.—The supplies in the local yards have grown to considerable dimensions during the week, and prices are not firm. No. 1 Wrought Scrap is quoted at $20@$21, with some little business doing.

Pittsburg. April 8.

[From our Special Correspondent.]

Pig-Iron.—The market since our last has presented nothing of particular importance except a slight falling off in the demand, and a weakening in values and indifference on the part of buyers.

A number of contracts placed early in the year for crude iron will expire soon; but thus far, little or no effort has been made by buyers to replenish stocks or to provide for spring and summer requirements. A short time ago, the opinion was entertained, even by buyers, that the upward tendency was strong and would land prices for more desirable brands of iron at least 50 cents a ton higher. Various causes have co-operated to arrest this tendency, even if it were a genuine one. To-day, it does not seem probable that higher than present prices will be insisted upon or paid. The serious obstacle is the inability of buyers to pay higher prices. Finished products have not advanced, and are not likely to. Demand has been checked by labor strikes and other causes, and consumers of iron are disinclined to take any risks, and prefer to wait until they can see their way more clearly before appearing in the market.

Southern Pig-Iron.—Since my last report, several sales of Southern iron have been made here.

Coke Iron.—No. 1 Mill, $16.50 4 months; No. 2 Mill, $15.50 cash.

Charcoal.—No. 3 Hot-Blast, $19.50 cash. No. 1 Foundry, $20.75 cash.

Pig-Iron.—The current rates are as follows:

Coke or bituminous:	Lake ore.	Native ore.
Foundry No. 1	$17 50@$18.00	$17.50@$18.00
Foundry No. 2	16.75@ 17 25	16.50@ 17.00
Gray Forge No. 3	16.00@ 16.50	15.75@ 16.25
" " No. 4	15.25@ 15.50	.... @ .....
White	14.50@ 15 00	14.50@ 15.00
Mottled	14.50@ 15.00	14.50@ 15.00
Bessemer	19.50@ 20.00	.....@ .....
Charcoal:		
Foundry No. 1	21.50@ 23.00	
Foundry No. 2	20.00@ 20.50	
Cold-Blast	25.00@ 28.00	
Warm-Blast	18.00@ 24.00	

Muck-Bars.—The demand was less active and prices weaker, though not quotably lower. Prices range from $27.75@$28 cash.

Spiegel.—Steady, $28.50@$29 cash.

Steel Blooms.—Unchanged, $31@$36.

Steel Rail Crop-Ends.—Declined to $23.

Steel Slabs.—Steady, $29@$33.

Old Rails.—Dull, buyers offering lower prices. We quote nominally $22@$22.50.

Wrought Scrap.—Buyers disposed to hold off, waiting for lower prices. Holders ask for No. 1 $19.50@$20; No. 2, $17@$18.

Steel Rails.—The advance noted last week has been maintained; present rates, $36; Light sections, $35@$42.

Bar Iron.—Demand limited, prices unchanged, $1.70@$1.75 per cwt.

Nails.—Demand light, prices normal, $2.25@$2.30 per keg.

SALES IN PITTSBURG.

2000 tons	Gray Forge Lake ore, at furnace	$16.50	cash.
650 "	" " "	16.50	4 mos.
500 "	Gray Forge Native ore	16.50	"
150 "	Cold blast charcoal	22.50	cash
50 "	"	25.00	"
500 "	Southern, No. 1 mill	16.50	4 mos.
100 "	" No. 2 "	15.50	"
250 "	" No. 3 Hot blast charcoal	19.50	"

COAL TRADE REVIEW.

NEW YORK, Friday Evening, April 9.

Statistics.

Production Anthracite Coal for week ended April 3d, and year from January 1st:

TONS OF 2240 LBS.	1886. Week.	1886. Year.	1885. Week.	1885. Year.
P. & Read. RR. Co.	215,556	2,464,467	157,669	2,198,277
L. V. RR. Co.	123,012	1,555,686	92,056	929,665
D. L. & W. RR. Co.	101,874	1,433,641	95,944	976,639
D., & H. Canal Co.	87,918	1,068,227	60,357	627,637
Penna. RR.	60,283	820,071	49,569	678,639
Penna. Coal Co.	30,234	289,475	22,200	257,080
Total	618,877	7,631,567	477,795	5,667,937
Increase	141,082	1,963,730	....	.....
Decrease	.....	.....	.....	.....

* Estimated.

The above table does not include the amount of coal consumed and sold at the mines, which is about six per cent of the whole production.

Production for corresponding period:

1881	6,300,608	1883	6,774,357
1882	5,946,195	1884	6,128,591

Production Bituminous Coal for week ended April 3d, and year from January 1st:

Tons of 2000 pounds, unless otherwise designated.

EASTERN AND NORTHERN SHIPMENTS.

	1886. Week.	1886. Year.	1885. Week.	1885. Year.
Phila. & Erie RR.	24	3,987	.....	.....
**Cumberland, Md.*	1,677	371,310	56,660	529,106
**Barclay, Pa.*	2,955	51,869	.....	68,242
**Broad Top, Pa.*				
H. & Broad Top RR.	†	71,121	3,946	42,233
East Broad Top	.....	.....	.....	.....
Clearfield Region, Pa.				
Snow Shoe	.....	34,770	3,313	56,049
Karthaus (Keating)	2,000	35,543	1,828	41,360
Tyrone & Clearfield	2,675	546,231	58,876	806,206
Alleghany Region, Pa.				
Gallitzin & Mountain	19,896	170,543	7,135	130,142
Total	29,227	1,285,374	131,758	1,673,338

* Tons of 2240 lbs.
† Report not received.

WESTERN SHIPMENTS.‡

Pittsburg Region, Pa.				
West Penn RR.	6,612	67,510	6,281	69,004
SouthwestPenn. RR.	6,794	38,300	2,815	28,255
Pennsylvania RR.	9,285	56,296	144	50,881
Westmoreland Region, Pa.				
Pennsylvania RR.	10,150	305,952	7,424	244,465
Monongahela Region, Pa.				
Pennsylvania RR.	3,106	52,158	3,622	49,533
Total	35,947	520,216	22,286	442,138
Grand total	65,174	1,805,590	154,044	2,115,476

‡ Considerable gas-coal shipped East, of which no division is made in report.

Production of Coke on line of Pennsylvania RR. for week ended April 3d, and year from January 1st: Tons of 2000 pounds.

	1886.		1885.	
	Week.	Year.	Week.	Year
Allegheny Region.	4,562	49,363	3,593	48,677
West Penn. RR....	1,699	23,715	1,246	6,245
Southwest Penn. RR	55,011	489,613	40,240	483,413
Penn. & W. Region	6,247	86,193	3,474	66,373
Monongahela	4,242	23,656	2,150	20,943
Pittsburg Region.	.....	... ...	.....	.....
Snow Shoe.....	.....	9,211	90	4,016
Total.....	71,761	681,751	50,743	629,667

The Norfolk & Western Railroad Company reports the shipments of Pocahontas Flat-Top coal for the week ended April 3d, 1886, and year from January 1st as follows, tons of 2000 pounds: 1886—Week, 11,314; year, 186,234. 1885—Week, 12,404; year, 129,183. Decrease, 1886—Week, 1090; increase, year, 57,051.

Anthracite.

Of the trade, but little can be said. It has been quiet at prices that ruled a week ago.

The event of the week has been the formation of a coal combination, if we are permitted to use so objectionable a term. On Monday, a meeting was held in this city, at which all of the companies were amply represented. After several hours' work, it was finally agreed to make the basis for the year 33,500,000 tons, give the Pennsylvania Railroad 3,500,000 tons, and divide the remaining 30,000,000 among the other companies according to the percentages they held last year. This gives the following result:

	Per cent.	Tonnage.
Reading...	37·82	12,669.000
Lehigh Valley.....	19·07	6,390,000
Delaware, Lackawanna & West.	15·63	5,235.000
Delaware & Hudson	10·70	3,585.000
Pennsylvania Coal.....	4·87	1,632,000
Erie.....	1·46	489,000
Pennsylvania Railroad	10 45	3,500.000
	100·00	33,500,000

An excellent feature of this arrangement is, that the monthly shipments have not been anticipated at the beginning of the year, but are to be decided upon about the 20th of each preceding month. A committee, composed of Messrs. Potts, Holden, and Harris, was appointed to report at the meetings of the full board the quantity that should be mined during the following month. These gentlemen, from their large and constant contact with the market, ought to be able to decide with much clearer judgment what the market will require than the presidents of the large companies, whose many duties prevent them from knowing or ascertaining what may be needed. Under this arrangement, the production may be practically curtailed to meet the actual requirements of the market until next March, and then, if it is found that the trade has taken more than had been expected for the eleven months, the tonnage for the remaining month can be increased. If, however, it is found that the unmined portion of the 33,500,000 tons is too great for that month's shipment, cool judgment may conclude to restrict, and even though such should not be the case, a flooded market for one month would not be a very serious matter.

It appears to an outsider as rather ridiculous that, after all of the bluster of the last four months, the emphatic expressions of what the companies must have, and what they would not take, finally they all stand where they stood when the contest began. If the millions of dollars apparently thrown away should result in educating the managers and causing them to act with better judgment in the future, it would not be so bad; but we fear the same old farce will have to be repeated year after year so long as stock-jobbing continues to control the management of this great industry.

So far, there is not much confidence in the new combination. This is not surprising, as upon its face it does not commend itself as a very stable affair; but the true spirit of the arrangement and its underlying strength are not announced to the public. This compact is not the result of any brilliant diplomatic work of the managers, but is the outgrowth of pressure and cool common sense brought to bear by the capitalists at the back of these large corporations, and from all present appearances the same influences will prevail during the year to prevent the arrangement becoming inoperative, by the unwise efforts to overreach one another that have been so prominent a feature in past combinations.

President Roberts, of the Pennsylvania Railroad, is quoted as describing his company's position as follows:

"The Pennsylvania Railroad Company has not in any manner departed, nor does it intend to depart, from its position heretofore assumed, to wit, that it will be no party to any artificial restriction upon tonnage, or product, or to any artificial advance in price. Assuming, however, the belief of the Anthracite Association that the natural increase of consumption in 1886 will not vary much from the increase of past years, which has averaged about 6 per cent annually, it was quite willing to give its assurance that its own increase of production during 1886 would not exceed that generally conceded average—that is to say, its production of 1885 with 6 per cent of tonnage added—but it will not consent to exert any influence whatever on its individual producers and shippers as to the amount of their respective production. It will, as heretofore, extend all its facilities to the transportation of their respective shipments, whatever the capacity and business discretion of the shippers may see fit to make them."

The fact is, that the popular cry in the State of Pennsylvania is against monopolies, discrimination, combinations, etc., and the politicians are anxiously hoping to get a good case against the largest and richest corporation in the State. Mr. Roberts knows this, and were it not for this cause, he would openly be one of its stanchest supporters. It is all nonsense for him to say that the company will not be a party "to any artificial restriction upon tonnage, or product, or to any artificial advance in price." The company is a party to a bituminous coal pool, to trunk line pools, and all sorts of arrangements that restrict production and advance prices. The effect of these arrangements is not so directly felt by the masses, as is an arrangement to curtail the production and artificially advance the price of a prime necessity like coal, and hence they are not so dangerous to practice. Naturally, the rate on grain from Chicago to New York would be about 10 cents per cwt.; but a trunk line pool, of which the Pennsylvania road is the most important member, says that it shall be 20 cents; and from this cause alone a poor man has to pay an advance on the price of the bread that he eats equal to that which he would have to pay upon his coal secured from a full-fledged coal combination; but in all of its ramifications he is unable to trace the cause of an advance in bread.

The Pennsylvania Railroad officials want it distinctly understood that the company is not in the combination. At the same time, they want it to succeed, and will do as much to help it and less to make it a failure than any other interest. The mining of anthracite coal is one of the most important industries in the State, and in a prosperous condition it directly and indirectly adds greatly to the prosperity of the Pennsylvania road. So far as this road is concerned, there need be no fears, as at the end of the year it will be found to have been more in the combination than it ever was before, which is not saying much.

We think that coal can probably be purchased lower now than at any time later in the year, and advise our readers to make purchases. There is a strong desire to make an advance about the middle of this month. We think, however, that it will not occur before the first of next month, when it will probably be 25 cents a ton. The restriction during this and next month will probably be so great as to enable the companies to maintain the advance. Furthermore, the miners are showing an aggressive feeling, and some demands from them are expected soon. It may be found impossible for the companies to grant them, in which event a strike may occur, when coal bought now, at less than cost, will be found to be an extraordinary bargain.

We quote ordinary free-burning coals f. o. b. as follows:

	Week ended		
	April 9.	April 2.	March 26.
Lump..	$3.00@	$3.00@ ...	$2.85@ ....
Steamboat .	3.00@	3.00@	2.85@ ....
Broken.	2.85@	2.85@	2.85@ ....
Egg	2.85@	2.85@	2.85@ ...
Stove	3.20@ 3.35	3.25@	3.25@ ...
Chestnut....	3.00@ ...	3.00@	2.85@ 3.00
Pea	2.00@ 2.15	1.75@ 2.15	1.75@ 2.00
Buckwheat.	1.75@	1.50@ 1.75	1.50@ ....
Dust	1.15@ 1.25	1.15@ 1.25	1.15@ ....

The improving tendency of the small coals is due to the demand for steam purposes caused by the strike of the bituminous miners. The same cause is greatly increasing the demand for broken and egg sizes.

The average of all coal sold by the Delaware, Lackawanna & Western Railroad Company, f. o. b. vessel at Hoboken, was for March $2.73 per ton. This gives an average of $2.78 for the first three months of this year.

Bituminous.

The situation is practically unchanged from a week ago. About the same mines are now idle that were last week. This strike is unfortunate all around. It was started and has been sustained by misrepresentations. A large amount of trade is going to anthracite and new bituminous districts, and both the companies and the miners will have to suffer from this cause, the former by the loss of business and the latter by a corresponding loss of employment.

Nova Scotia coal is offered in this market at prices that are likely to give it considerable business if the strike continues. Its true field will, however, be in the East, where it will probably be able to secure some important contracts from railroads and manufacturing establishments that are unwilling to change to anthracite coal.

The companies that are idle seem to be able to meet the necessities of all pressing contracts, and the amount of coal in sight is really very liberal under the circumstances.

During the week, the statement was going the rounds that miners working for the Berwind-White Coal Mining Company were only making on an average of about $10 a month. This is all nonsense. Any competent, industrious miner should make at least $50 a month, and many make much more.

Buffalo. April 8.

[From our Special Correspondent.]

Interesting items are scarce this week, excepting what are appended hereto. No changes have been made in the prices of anthracite coal, and none expected until the end of the month. The retail trade continues quite brisk, consequent upon weather prevailing that causes a good demand upon our bins. It is a general remark that such a universal depletion of family stocks was never known before, and it can only be accounted for by the strong winds that have prevailed this winter, rather than from extreme cold. The bituminous coal market is dull, and continues to be well supplied. The other features of the trade are unchanged and will probably remain so until the labor troubles are ended.

Coke is quiet and firm at nominally unvaried quotations, although a shade easier.

The change from warm to the severe cold weather experienced for several days will delay the opening of navigation. Dispatches from the Straits of Mackinaw state that the rain had covered the old ice with standing water, and the frost following made it solid again. Here the broken cakes have frozen together, and the ice-field is large, and in many places packed and grounded. The ice has again entirely closed the harbor at Erie, Pa. Advices from Escanaba to-day say that there is no indication of the ice breaking up in that vicinity.

Many vessels are coal-laden here, awaiting the opening of navigation. Inquiry on 'Change this morning elicited the following relative to lake freights: "It is reported that a propeller and consorts have been chartered to a Lake Superior port (probably Duluth) for three trips before September 1st at 45 cents a gross ton." "The nominal asking rates are, per gross ton: 60c. to Chicago, 55c. to Milwaukee, 45c. to Duluth, and 40c. to Toledo. Vessels that are loading will take the opening going rate, whatever that may be. Shippers are holding off from making positive agreements, expecting a lowering of vessel-men's views.

It is estimated that over 120,000 tons of anthracite coal are on the docks here, awaiting shipment by lake to Western points.

A propeller and consort have been chartered at Toledo with coal to Milwaukee at 60 cents—whether gross or net tons is not stated.

The Welland Canal will be opened for navigation April 19th.

At a meeting of the Lake Carriers' Association Board of Managers, on Tuesday last, the following preamble and resolution were passed:

"*Whereas*, It has been reported to the Lake Carriers' Association that the coal shippers propose to have vessels carry anthracite coal from Buffalo West at rates per gross ton instead of as heretofore, at rates per net ton; and

"*Whereas*, The only apparent object for this change is to indirectly reduce the compensation vessels shall receive for carrying coal; therefore be it

"*Resolved*, That this Board consider the proposed change unjust and unfair to the lake carrying interests, and hereby recommend the members of this Association to carry coal from Buffalo only at rates made per net ton, as has been the custom heretofore."

It would be an excellent plan to abolish the gross ton

NEW YORK MINING STOCKS.

DIVIDEND-PAYING MINES.

NAME AND LOCATION OF COMPANY.	HIGHEST AND LOWEST PRICES PER SHARE AT WHICH SALES WERE MADE.												SALES.
	April 3.		April 5.		April 6		April 7.		April 8.		April 9.		
	H.	L.	H.	L.	H.	L.	H	L.	H.	L.	H.	L.	
Alice, Mon.							1.50						100
Amie Con., Co.			.03				.04						2,0 0
Argenta			.18										300
Bassick, Co.	10												200
Belle Isle, Ne.													
Bodie Cons., Ca.	1.10	1.00	1 15		1.15		1 10	1.05	1.05		1.10		3,600
Breece													
Bulwer, Ca.	.55		.58	.53	.62	.60	.63	.62	.63	.6	.60	.58	7,900
Cal., B. H.	.90												100
Castle Creek													
Chrysolite, Co.	.63		.61										900
Colorado Central													
Cons. Cal. & Va., Ne.	2.15	2 10	2.10	2 05	2.10	2 05	2.15	2.05	2.05		2 05		6,600
Crown Point													
Dunkin, Co.													
Eureka Cons., Ne.	1.50		1.50		1.50								925
Father de Smet, Dk.					1.90		1 20	1.15	1.10				650
Freeland													
Gold Stripe, Ca.													
Gould & Curry, Ne.	.75		.65								.66		700
Grand Prize, Ne.													
Green Mountain, Ca.													
Hale & Norcross, Ne.	2.50		2.45		2 45		2 50				2.50		1,500
Hall-Anderson, N. S.													
Homestake, Dk.	17.75								17.75				115
Horn-Silver, Ut.			3.00							3 10	3.00		1,025
Independence, Ne.													
Iron Silver, Co.					2 20						2.05		700
Leadville C., Co.	.25		.24	.23	.25								4,400
Little Chief, Co.	.23				.22		.22	.21	.22		.22	.21	4,400
Little Pittsburg, Co.													
Martin White, Ne.													
Moulton							1 40						500
Navajo, Ne.	.25												400
North Belle Isle, Ne.					.22								1,200
Ontario, Ut											30.00		100
Ophir			.80										600
Osceola													
Plymouth													
Quicksilver Pref., Ca.					21.00		21.50						200
" Com., Ca.													
Quincy													
Robinson Cons., Co.											.77		100
Savage, Ne.	1.15				1.20						1 25		950
Sierra Nevada, Ne.					.60		.60	.52			.53		1,300
Silver King, Ar.													
Spring Valley, Ca.													
Standard, Ca.													
Stormont, Ut.			.13		.14								800
Tip Top, Ar.													
Yellow Jacket											.95		200

NON-DIVIDEND-PAYING MINES.

NAME AND LOCATION OF COMPANY.	HIGHEST AND LOWEST PRICES PER SHARE AT WHICH SALES WERE MADE.												SALES.
	April 3.		April 5.		April 6.		April 7.		April 8.		April 9.		
	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	
Albion													
Alta													
American Flag													
Barcelona, s.													
Bechtel Con., s.													
Belvidere													
Belcher													
Best & Belcher, s.							1 30		1 20				550
Big Pittsburg, s. l.													
Bowman Silver													
Bull-Domingo, s. l.													
Central Ariz'na, s.							.10		.09				2,000
Challar													
Cons. Imperial													
Con. Pacific													
Cusi													
Decatur													
Durango, s.													
Eastern Oregon													
Goodshaw, s.													
Harlem M. & M. Co.													
Harshaw													
Kossuth													
Lacrosse, s.	.09		.09						.08		.09		5,000
Mariposa Pref., s.													
" Com., s.													
Mexican, s. s.													
Mono							2.00						400
New Pittsburg													
North Standard, s.													
N. Horn-Silv'r, s. l.													
Pri'nt'l & Miller, s.													
Plutus													
Potosi													
Rappahannock, s.	.13					.13		.12		.13		.12	6,000
Red Elephant, s.													
Ridge													
Silver Cliff, s.													
Sonora Con.													
South Bodie, s.													
South Bulwer, s.													
South Hite													
South Pacific													
State Line, 1 & 4, s.													
" Nos. 2 & 3, s.													
Sutro Tunnel			.18	.17	.18			.18		.17			12,600
Tamarack													
Tioga													
Unadilla, s.													
Union Cons., s. s.						.55		.45					600
Utah													

Divide nd shares sold, 42,465. Non-dividend shares sold, 27,150.

in all transactions. It is an old-fashioned, clumsy nuisance, to say the least; as well revive the sixpences and shillings, in place of the nickels and dimes! At wholesale you buy by the gross ton, but at retail the net ton. Why this absurdity?

There is another snarl over the natural gas supply. The mayor has refused to accept or sign the $100,000 bond of the company to whom the charter was granted, on the ground that the whole proceedings conflict with certain statutes in existence in the State laws. The bond provides that in six months from granting the franchise the company shall lay its mains and be able to furnish gas in quantities equal to 2,000,000 cubic feet per twenty-four hours, or the $100,000 shall be paid the city as liquidated damages and not as a forfeiture or penalty. In case the company does perform the conditions, the obligation is void. The bond was signed by Messrs. Daniel O'Day, Hascal L. Taylor, and John Satterfield—all Standard oil people. The sources whence the natural gas is to be brought are 87 miles from our city and 600 feet above our level.

The Superintendent of Public Works announces that the canals of the State will be ready for navigation on the 20th of April, and will be opened on that day if necessary for the interest of commerce.

Boston. April 7.

[From our Special Correspondent.]

I find myself obliged to report less activity than last week. The market is in an unusual condition. Some of the companies are quietly insisting upon $3 for Broken and Egg f. o. b. at New York, and $3.40 for Stove. I say quietly, because they are doing nothing at those figures, and can not expect to. There is a small tonnage placing by those who are not held up to such high limits, quoting $3.25@$3.35 for Stove and $2.80@$3 for Broken and Egg in such cases. Unless the combination scheme shall amount to more than it has thus far, prices can not be maintained where they are, to say nothing of pushing them ahead. The market needs a strong support. The public is wearying of these continual hitches in the combination scheme.

It is noticeable that the smaller sizes of anthracite have not been shoved ahead in price quite as much as stove and broken and egg. Pea coal holds its own with the rest of the market, however. This popular size can be burned on the same grate with bituminous coal, while buckwheat and pea and dust require special grates. Hence the disposition of manufacturers using soft coal to buy some pea coal when it is very low, as at present. Prices for this size are about $1.70@$1.80 at New York. It is said that the Philadelphia & Reading Company has already placed nearly two thirds of its yearly output of pea coal.

The same good reason for a dull trade in bituminous coal exists in the fact that bituminous shippers have no coal to sell. There is a good demand from manufacturers, and several of the railroads centering here are short of coal. The scarcity of coal available for shipment grows greater every week, and that shipper may think himself lucky who can keep his own customers from growling. Cargo lots for immediate delivery will bring high prices according to the urgency of the buyer's needs. Delivered prices are irregular and hard to quote. As for the strike, it seems to be a question of nerve. There is no question but that the operators are paying all they can afford to at present prices for coal; but if the miners hold out long enough, the victory will be with them. A sign of weakness on the part of the operators, as it seems to us, is the action of some parties in the Clearfield District who have persuaded their men to go to work on the promise of as high wages as shall be determined upon by the strike. There has been some attempt made to bring coal here from Nova Scotia, but it is still wintry there. It is reported that a steamer has chartered from Halifax to New York with coal at the very low rate of $1.25, as this steamer was going south any way to engage in the West India fruit trade.

There is an easy feeling in freights. Rates are away down to the minimum, but the endeavor to break through them is not generally successful. Many vessels have been lost this season; and if it were not for the strike in the bituminous regions, rates would not now be down to the minimum. We quote freights exclusive of discharging:

New York, 90c.; Philadelphia, $1.05; Baltimore, nominal; Newport News, $1.05@$1.10; Richmond, $1.25; Cape Breton, $1.60@$1.75; Bay of Fundy, $1.40@$1.50.

There is a light trade. Prices are unsettled. The dealer who advertised extreme low prices has not done the popular thing, to say the least.

Pittsburg. April 8.

[From our Special Correspondent.]

The coal trade, at least so far as shipping is concerned, has been active. The amount shipped South and West by the Ohio River from March 17th to March 30th, 16,566,000 bushels, equal to 625,152 tons. Since that time, the water generally has been too high, weather unfavorable, and shipments light. Only a limited amount of the above was for the Cincinnati market, the bulk going farther South. The present high water has caused a suspension of work at several of the pits.

Prices continue weak. River, wholesale on board 4@5c. a bushel. Railroad, 4¼@4¾c. A number of the railroad miners are out on a strike.

Coke shipments continue active from the Connellsville coke regions, averaging 975 cars a day. Fully 10,000 ovens are in operation. The rates are: Blast-Furnace, $1.35 f. o. b. cars at the ovens; Foundry, $1.50; crushed, $1.80@$2.

At this writing, there is a prospect of another strike in the coke regions.

New Orleans. April 2.

[Reported by C. A. MILTENBERGER & Co.]

The demand for Pittsburg coal during the past month has shown a decided improvement over the usual consumption for March, due principally to the fact that both retail dealers and consumers were out of stock, and, on arrival of a number of tows during the month with freshly mined coal, supplied themselves, and swelled the amount for consumption considerably. Another large output of coal from the mines has been made on the high stage of water in the Ohio River during the past two weeks; but the bulk of these shipments will be delivered at sugar plantations *en route*. The demand from the planters will be large this season, as but few of them have any coal left over from last year; besides, it is generally believed that there will be no very high water to fear on account of overflows. Wholesale rates, owing to the anxiety to realize on sales, have still further declined, Pittsburg coal, by boat-load, being now quoted at from 27@28c. a barrel, while retail prices are nominal at previous quotations.

FINANCIAL.

Mining Stocks.

NEW YORK, Friday Evening, April 9.

The business of the mining market shows an increased interest, with dealings well distributed throughout the list. A firm tendency in prices has, on the whole, prevailed. The total transactions were 69,615 shares, showing an increase of 3940 shares, compared with those of the preceding week.

Considerable interest has again been manifested in

COAL STOCKS.

NAME OF COMPANY.	Par value of shares.	Quotations of New York stocks are based on the equivalent of $100. Philadelphia prices are quoted so much per share. April 3. H.	April 3. L.	April 5. H.	April 5. L.	April 6. H.	April 6. L.	April 7. H.	April 7. L.	April 8. H.	April 8. L.	April 9. H.	April 9. L.	Sales from April 3d to April 9th, inclusive.
Barclay Coal														
Cameron Coal	50			15¾		15¾		15¾				15¾		743
Col. C. & I	10	24	23¾	24½		24¾	24¼	24¾	24	24¼		25	24½	1,165
Ches. & O. RR	100							10		10		10		500
Consol. Coal	100													
Cumb. C. & I	100													
Del. & H. C	100	100⅝	99⅝	101¾	99⅞	101⅛	100¾	101¾	101¼	101¾	101¼	101¾	100⅞	28,481
D., L. & W. RR	50	125⅛	123⅝	126⅞	123¾	127	125⅛	127⅛	126½	127½	126¾	127¼	126½	352,005
Elk Lick Coal Co														
Lehigh C. & N.†	50	50⅞	50¾	51¼	50¾			51⅛	51¼	51½				2,687
Lehigh Valley RR.†	50	57½	57	57½				57½	57¼	57½	57¼			553
L. & W. Co. & C. I Co.														
Maryland Coal	100											10½	10	150
Montauk Coal	100													
Morris & Essex	50													
New Central Coal	100													
N. J. C. RR	100	48⅛	47½	49½	48	49¼	48¼	52¾	49¾	55	53⅜	54⅝	53½	82,835
N. Y. & S. Coal	50													
Penn. Coal	50													
Penn. RR.†	50	53¼	53¼	53½	53⅛			53⅝	53⅝	53¾	53½			2,877
Ph. & R. RR.*	50	24	23⅝	24½	24	24¼	23¾	25⅛	24¼	26	24⅝	25½	24	105,823
Spring Mountain	50													
Westmoreland Coal†	50													

* Of the sales of this stock, 25,723 were in Philadelphia, and 80,100 in New York.
† The quotations for these stocks are not percentage, but actual price. Total sales, 577,819.

the Comstocks. Consolidated California & Virginia has been extensively dealt in at steady prices, ranging from $2.05@$2.15. Hale & Norcross has remained at from $2.45@$2.51. Sutro Tunnel sold at 17c. and 18c. Among the other Nevada stocks, Eureka again appears on the list at $1.50.

Father de Smet has declined still further, going from $1.30@$1.10. Caledonia showed sales of only 100 shares at 90c. a share; the dividend for March has been passed, and for April, so far, has not yet been declared. Father de Smet has paid no dividend this year, and to this fact may be attributed the varying declining movement of the stock. Homestake ruled at $17.75.

Leadville and Little Chief show the same number of sales—4400 shares. The price also shows but little difference. The former was quoted at from 23@25c., and the latter at 21@23c. Lacrosse is active as usual at from 8@9c. Iron Silver declined from $2.20@$2.05. Chrysolite ruled at 63@61c. The "grand old Bassick," which will shortly appear reorganized, we understand, is selling at 10c.

The stocks of the "Golden State" have apparently lost favor for many weeks past; but small transactions comparatively have occurred in a few of the stocks. Bulwer during the week had a little boom, going from 53@63c., closing at 58c., with sales of 7905 shares. Bodie was active at from $1@$1.15. Mono sold at $2. Quicksilver Preferred at $21 and $21.50.

But a small business was done in Horn-Silver at $3@$3.10. Stormont, at 13@15c. Rappahannock continues in favor at 12@13c. Moulton and Alice sold respectively at $1.40 and $1.50.

The Farmers' Loan and Trust Company, Nos. 20 and 22 William street, New York City, will receive proposals until April 17th, addressed to R. G. Rolston, President, for the sale to the trustee of twenty bonds of the South Yuba Water and Mining Company for the sinking fund, as provided in the mortgage.

The Superior Iron Company, of Ashland County, Wisconsin, offers for sale a limited amount of full-paid and non-assessable stock, the proceeds to be used as working capital. Further particulars can be obtained at Room 41, Washington Building, No. 1 Broadway, New York City.

The following securities were sold at auction in this city on the 7th inst.: $2000 Owens Lake Silver Lead Mining Company, of Tulare County, Cal., 7 per cent bonds, interest March and September, $500 each, for lot, $16; 3950 shares Union Consolidated Mining Company, of Cerro Gordo, Inyo County, Cal., $100 each, for lot, $22; 1800 shares Hudson River Peat Company, $5 each, for lot $7; 342 shares Owens Lake Silver Lead Company, of Tulare County, Cal., $50 each, for lot, $5; 20 shares Mutual Gold Mining Company, of New York, $20 each, for lot $3; 569 shares Commercial Silver Mining Company of Smoky Valley District, Nevada, $20 each, for lot $10.

Coal Stocks.

The week under review has been a quiet and uninteresting one in the stock market. On Saturday and Monday, the coal stocks were weak, but recovered on the announcement of the formation of a coal combination, and have been strong ever since, with but little activity. The dealings in Delaware, Lackawanna & Western have aggregated 352,005 shares at $123⅝@$127½, closing at $126⅝. Delaware & Hudson has ranged between $99⅜@$101¾, closing at $101, with sales of 28,481 shares. Reading has been dealt in to the extent of 80,100 shares at $23⅝@$26, closing at $24½. Jersey Central has been active and very strong. This has been due to an apparent change in the control and an effort to put the company on its feet in an independent position. The dealings amount to 82,835 shares at $47½@$55, closing at $54. The market closed weak.

Meetings.

The annual and special meetings of the following companies will be held at the times mentioned:

Glendon Iron Company, No. 18 Post-Office Square, Boston, Mass., May 5th, at eleven o'clock A.M.

Lykens Valley Railroad and Coal Company, office of Edward Hoffman, No. 115 Chestnut street, Philadelphia, Pa., May 3d, at one o'clock P.M.

Philadelphia Company (Natural Gas), No. 933 Penn Avenue, Pittsburg, Pa., May 26th, at eleven o'clock A.M.; the question of increasing the capital stock will be discussed

Dividends.

Boston & Montana Gold Mining Company, of Montana, has declared dividend No. 22, of 15 cents a share, or $30,000, payable April 28th, to stockholders of record April 12th, at No. 30 Broad street, New York City.

Bridgewater Natural Gas Company, of Pennsylvania, paid dividend No. 1, of one per cent, on the 1st inst.

Silver King Mining Company, of Arizona, has declared dividend No. 57, of 25 cents a share, or $25,000, payable April 15th, at San Francisco.

Tuna Oil Company, of Pennsylvania, has declared a quarterly dividend of four per cent, payable on and after April 1st, at Pittsburg.

Valencia Mica Company, of New Hampshire, has declared a quarterly dividend of two dollars and fifty cents a share, payable April 20th, at No. 115 Broadway, New York City.

Washington Natural Gas Company, of Pennsylvania, will pay its regular one per cent monthly dividend at Pittsburg.

Pipe Line Certificates.

The following table gives the quotations and sales at the Consolidated Stock and Petroleum Exchange:

		Opening.	Highest.	Lowest.	Closing.	Sales.
April	3	71½	72⅛	71½	72	2,751,000
	5	72¼	73⅝	71¾	73¼	5,984,000
	6	73¼	73⅞	72⅛	72¾	2,860,000
	7	72¾	73	72⅛	72⅝	3,032,000
	8	72⅝	73	72⅜	72⅜	1,270,000
	9	73	73	72½	73	1,604,000
Total sales						17,501,000

Boston Copper and Silver Stocks.

[From our Special Correspondent.]

BOSTON, April 7.

To-morrow being fast-day and a legal holiday in Massachusetts, our report for the market is made up to the close of business this day. The market for copper stocks has ruled very quiet the past week, with a tendency to lower prices. Calumet & Hecla, however, is steady at $230, although to-day it weakened a little, and sold off $1, closing $228 bid, $230 asked. Tamarack advanced to $98 on sales of 57 shares only. Quincy was more freely offered, and declined from $50½@$49½, with sales of 120 shares. Franklin, on a forced sale of 100 shares, declined from $13⅞@$13, which was the only sale for the week. There was considerable pressure to sell Osceola, and, in consequence, it declined from $16@$15, with sales of about 300 shares. Arnold sold at 40c. The remainder of the list was neglected, the market closing dull and featureless.

The silver stocks have apparently gone to sleep, the only sale at the Boston Stock Exchange being a lot of 700 shares of Napa Quicksilver, which sold at $1.

At the Mining Exchange, there was no feature, and very little activity. Bowman Silver was in little better request, and sold at 14c. Dunkin, 28@32c. Catalpa, 30@32½c. Blue Ridge Gold, firm at 45@50c.

ASSESSMENTS.

COMPANY.	No.	When levied.	Delinquent in office.	Day of sale.	Amount.
Alpha, Nev	20	Mar. 4	April 8	Apl. 29	.50
Andes, Nev	28	Feb. 16	Mar. 23	Apl. 12	.25
Black Hills Oil, Dak	....	Feb. —	Mar. 15	Apl. 10	.02
Buena Vista Petroleum, Cal	33	Mar. 16	April 20	May 10	1.60
Columbia, Dak	....	Mar. 15	April 15	May 15	.01
Con. Pac., Cal.	8	Feb. 18	Mar. 22	Apl. 15	.15
Crocker, Ariz	2	Mar. 10	Apl. 13	May 4	.20
Enterprise, Dak	....	Feb 6			.01
Gould & Curry, Nev.	52	Mar. 27	Apl. 30	May 25	.40
Martin White, Nev	21	Mar. 12	Apl. 20	May 20	.25
Navajo, Nev	15	Mar. 30	May 4	May 27	.25
North Belle Isle, Nev	10	Mar. 2	April 6	Apl. 28	.20
Omilak, Alaska	4	Feb. 20	Mar. 30	Apl. 17	.05
Peerless, Ariz	7	Mar. 3	April 5	Apl. 27	.25
Prompter, Ariz	7	Mar. 17	Apl. 5	May 6	.35
Ropes, Mich	....	Mar. 8	April 3	....	.10
Ruby, Dak	....	Mar. 13	Apl. 24	May 25	⅛
Wyoming Standard Oil, Dak	2	Feb. 24	Mar. 31	Apl. 10	.01

San Francisco Mining Stock Quotations.

Daily Range of Prices for the Week.

NAME OF COMPANY.	CLOSING QUOTATIONS. April 2.	April 3.	April 5.	April 6.	April 7.	April 8.
Albion						
Alpha						
Alta			.30		.30	
Argenta						
Bechtel						
Belcher			1.12½			
Belle Isle						
Best & Belcher	1.25	1.25	1.25		1.25	1.25
Bodie	1.00	1.12½	1.12½		1.12½	1.25
Bullion						
Bulwer			.65		.65	.60
Challar	.90	.90	.90		.90	.90
Con. Pacific	.30	.30	.25		.30	
Con. Cal. & Va.	2.12½	2.12½	2.12½		2.12½	2.12½
Crown Point	.95					
Day						
Elko Cons						
Eureka Cons						
Exchequer						
Gould & Curry	.75	.70	.70			.75
Grand Prize						
Hale & Norcross	2.62½	2.62½	2.62½		2.50	2.62½
Independence						
Martin White						
Mexican	.50	.55	.50		.50	.50
Mono	2.00	2.37½	2.12½		2.12½	2.25
Mount Diablo						
Navajo	.15	.15	.15		.15	
Northern Belle						
North Belle Isle						
Ophir		.80	.80			.75
Overman						
Potosi	.60		.55		.55	.60
Savage	1.25	1.12½	1.12½		1.12½	1.12½
Scorpion						
Sierra Nevada	.50		.50		.50	.45
Silver King						
Tip-Top						
Union Cons	.40	.40	.40		.40	
Utah					.65	.60
Wales Cons						
Yellow Jacket	.80	.70	.70			.70

DIVIDENDS.

PLYMOUTH CONSOLIDATED GOLD MINING COMPANY, 23 NASSAU STREET,
NEW YORK, March 26, 1886.
DIVIDEND NO. 35.

The Board of Trustees have declared a dividend of TWENTY-FIVE THOUSAND DOLLARS, the same being *twenty-five cents* per share of the capital stock of the company, payable on the fifth day of April, at the Company's offices in New York and San Francisco.

W. VAN NORDEN, President.

COLORADO CENTRAL CONSOLIDATED MINING COMPANY, 48 EXCHANGE PLACE, ROOM 26,
NEW YORK, March 11, 1886

Dividend NUMBER SEVEN, of 5 cents per share, has been declared to the stockholders of this company, payable on April 10th, at the Farmers' Loan and Trust Company.

Transfer-books close on April 1st, reopening on April 12th.

R. V. MARTINSEN,
Treasurer.

USEFUL BOOKS.

Books on Mining, Metallurgy, and Engineering are made a special feature, but books of all kinds will be furnished, postage paid, at publishers' prices.

A MANUAL OF THE THEORY AND PRACTICE OF TOPOGRAPHICAL SURVEYING by means of the Transit and Stadia, including Secondary Base-Line and Triangulation Measurements and the Projection of Maps; accompanied by Reduction Tables and Diagrams. By Prof. J. B. Johnson, Washington University. Plates of Map Lettering and Topographical Signs. 8vo, cloth. $1.25.

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